HP SAN Connection Manager User Guide

This user guide provides information about installing, upgrading, and removing the HP SAN Connection Manager version 3.30, viewing and managing SAN connections (switches, servers, subsystems, HBAs, and logical disks), and troubleshooting the SAN Connection Manager. This user guide is intended for network administrators who use the SAN Connection Manager software to view and manage their SAN.

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1 Introduction

SAN Connection Manager is a GUI-based management application for basic handling of SAN components such as HBAs, switches, and storage arrays (also referred to as *subsystems* in this guide). For managing storage arrays, it uses Microsoft's VDS. SAN Connection Manager provides simplified storage management for VDS-compliant storage devices in a single, integrated, wizard-based user interface.

This user guide is your key to learning and using all of the functionality that SAN Connection Manager offers for streamlining storage management by leveraging the VDS in Windows Server 2003 and Windows Server 2008.

IMPORTANT: SAN Connection Manager version 3.00 or later is required for the HP SN6000 Fibre Channel Switch. SAN Connection Manager version 2.10 and later can manage the 8/20q Fibre Channel Switch, and version 3.00 or later can manage the SN6000 Fibre Channel Switch, with active transparent router ports (TR_Ports). However, SAN Connection Manager cannot manage or discover remote switches or devices in the remote fabric. The Physical Connection map (see "Viewing a Physical Connection map," page 41) displays the remote fabric as a grayed-out switch, but SAN Connection Manager cannot manage the switch. To present LUNs to remote devices, use the management interface provided by each storage array.

SAN Connection Manager version 2.00 and earlier does not support the management of fabrics that include switches with active TR_Ports, and may disrupt communication between the 8/20q Fibre Channel Switch or SN6000 Fibre Channel Switch and the remote fabric.

NOTE: SAN Connection Manager supports the following switches:

- HP 8/20q Fibre Channel Switch
- HP SN6000 Stackable 8Gb 24-port Single Power Fibre Channel Switch
- HP SN6000 Stackable 8Gb 24-port Dual Power Fibre Channel Switch
- HP SN6000 Stackable 8Gb 12-port Single Power FC Switch

What's new in this release

SAN Connection Manager version 3.00 contains the following changes:

- Added support for HP SN6000 Stackable 8Gb 24-port Single Power Fibre Channel Switch
- Added support for HP SN6000 Stackable 8Gb 24-port Dual Power Fibre Channel Switch
- Added support for HP SN6000 Stackable 8Gb 12-port Single Power FC Switch
- Added Edit Manual FDMI List option on the Advanced Operations menu

SAN Connection Manager version 3.10 contains the following changes:

- Added the Change Discovery Refresh Interval option on the Advanced Operations menu
- Updated management station requirements
- SSCM Startup time improvement
- SSCM support of HP P2000 G3 FC Modular Smart Array
- Added support for SSCM running on Windows Server 2008 R2

SAN Connection Manager version 3.20 contains the following changes:

- Added support for configuring the VCEM user name/password/host server to enable discovery of c-Class Enclosures and creation of associations in SSCM to display them.
- Added support for viewing VCEM and c-Class enclosure properties
- Added support for VCEM configuration dialog in Advanced Options pull-down menu
- Added support for VCEM configuration in installation wizard

- Added support for VCEM enclosures/VC-FC displayed in main topology
- VCEM server view displays enclosure in tree and properties when selected
- VCEM server view displays VC-FC in tree and VC-FC properties when selected
- Added support for launching EFMS from SSCM

SAN Connection Manager version 3.30 contains the following changes:

- Re-branding of SSCM to SCM
- SCM Support for EVA array P6300
- SCM Support for EVA array P6500

System requirements

Before starting the installation, ensure that the server that will be running SAN Connection Manager meets the following minimum requirements:

- For the management station:
  - Windows Server 2003 R2 and Windows Storage Server 2003 R2 x64/x86 operating system with Service Pack 2 and Microsoft hotfix QFE932755 (updated Storport storage driver). The update is available on the Microsoft website: http://support.microsoft.com/kb/932755.
  - Windows Server 2008 x64/x86 operating system with Service Pack 2
  - Windows Server 2008 R2

  NOTE: SAN Connection Manager is IPv6 compatible when running on an operating system that supports IPv6.

  - 2 GB of memory for management stations
  - 200 MB of disk space for full management installation
  - One 2.0-GHz processor (multi-core CPU recommended)
  - One CD-ROM drive
  - One Ethernet port
  - One or more PCIe slots for the HP 81Q PCIe FC HBAs (or other supported FC HBAs)
  - JRE x86 1.5 or later
  - Internet browser: Microsoft IE, Netscape Navigator, or Mozilla Firefox
  - HP Command View EVA software—Required only for installations with EVA storage
- For supported non-management stations:
  - Windows versions supported for management stations
  - Windows Server 2003 SP2
  - Windows Server 2008
  - SLES 9 SP4, SLES 10 SP4, SLES 11 SP1
  - RHEL 4.8, RHEL 5.6, RHEL 6.1
  - Citrix 5.0 u3, Citrix 5.6
  - VMware ESX 3.5, 4.0, VMware 4.0 u2, VMware 4.1 u1
  - HP-UX 11.23, 11.31
  - 1 GB of memory
  - 60 MB of disk space for full non-management station installation
  - One CD-ROM drive
  - One Ethernet port
  - One or more PCIe slots for the HP 81Q PCIe FC HBAs (or other supported FC HBAs)
  - JRE x86 1.5 or later
  - Internet browser: Microsoft IE, Netscape Navigator, or Mozilla Firefox

2 Installing, Upgrading, and Removing HP SAN Connection Manager

This chapter provides procedures for installing and upgrading SAN Connection Manager on a Windows management station, and for installing and upgrading the required software components on other servers. It also provides procedures for removing SAN Connection Manager from a Windows system, as well as removing the software components from Linux servers.

Installing SAN Connection Manager: initial installation

Use the HP SAN Connection Manager CD to install the management software on your management station as described in "Windows installation: initial," page 12. Then use the same CD to install the HBA driver and other required software on each of the other servers in your SAN. Depending on the server operating system for the non-management station installations, refer to either the steps for "Windows installation: initial," page 12 or "Linux installation: initial," page 15.

NOTE: To configure servers using other operating systems or non-QLogic HBAs, see "Configuring SAN Connection Manager for HP-UX and Emulex HBAs," page 17.

Windows installation: initial

Follow these steps to install the SAN Connection Manager software on your management station, or to install the required non-management software on all other servers running Windows.

To install SAN Connection Manager on Windows:

1. Insert the installation CD into the CD-ROM drive of the server.

   The HP Installation Wizard starts automatically, and the initial installation window opens. (If the installer does not start automatically, run `Setup.exe` from the installation CD.)
2. Click **Next**.

   The end user license agreement appears.
3. Read the text of the HP end user license agreement, and then either click **Agree** to start the software installation or click **Disagree** to cancel the installation.

   The installation options window (Figure 1) opens.

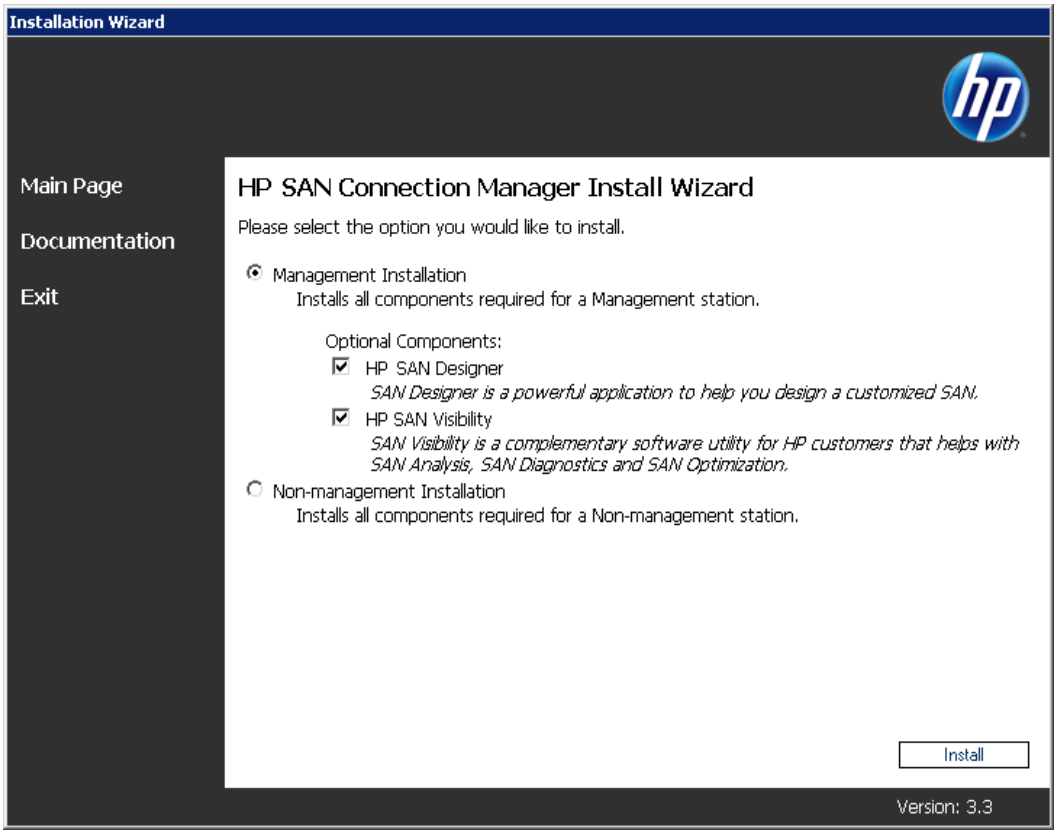

Figure 1 Installation wizard: options

4. Select one of the following product installation options:
   - **Management Installation**
     Installs all components required for a management station with both EVA and MSA storage.

     With the Management Installation, you can also select one or both of the following optional components:
     - **HP SAN Designer** provides quick and easy ways to design SANs based on your specific performance, cost, and future storage needs. The tool generates a SAN topology diagram, a detailed list of required SAN components, as well as recommendations for planning your future growth requirements.
     - **HP SAN Visibility** is a SAN data analysis tool that securely analyzes your SAN configuration, and provides an automated inventory process for switches, HBAs, and storage systems, including firmware version verification.
   - **Non-management Installation**
     Installs all components required for a non-management station.

5. Click **Install**.

   The installation progress window appears briefly, and then the Available Storage Subsystem dialog box (Figure 2) prompts you to select the type of HP storage subsystem for this station.

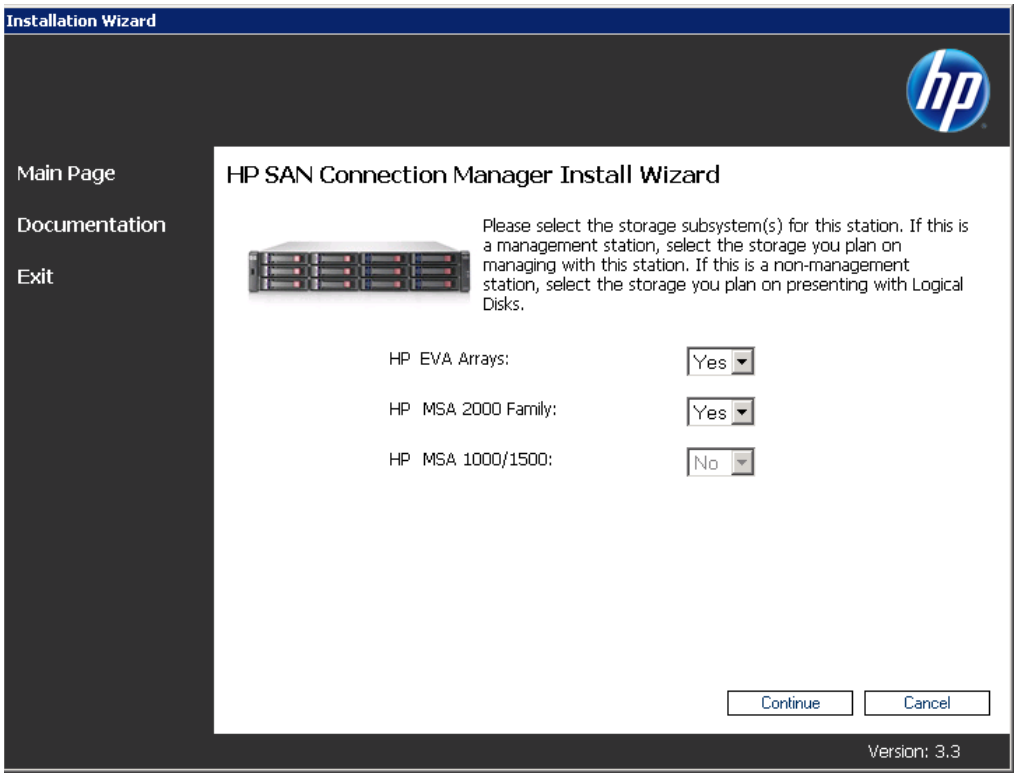

Figure 2 Installation wizard: Available Storage Subsystem

6. Select one or more types of storage subsystems (EVA and MSA) that exist in your SAN by choosing **Yes** from the drop-down menu for the appropriate subsystem types. Then click **OK** to close this dialog box and continue the installation.

   The progress window monitors the installation. A progress bar shows the percent of the installation completed and icons show the status of each component as it is installed, for example:

   - A icon indicates successful installation of the component.
   - A icon indicates that the component is not yet installed.
   - A icon indicates that an error occurred during installation of this component. (The final wizard window will provide additional information about component installation errors.)

   When the first component, the HP FC driver, is installed, a diagnostic window shows the HBA properties and targets found.

7. Click **OK** to close the SAN diagnostic window and continue the installation, or click **Cancel** to stop the installation.

   If the SAN Connection Manager software component is installed on a system with EVA storage, the Add EVA Management Account dialog box (Figure 3) prompts you to either select an existing user account or to create a user account to manage your EVA.

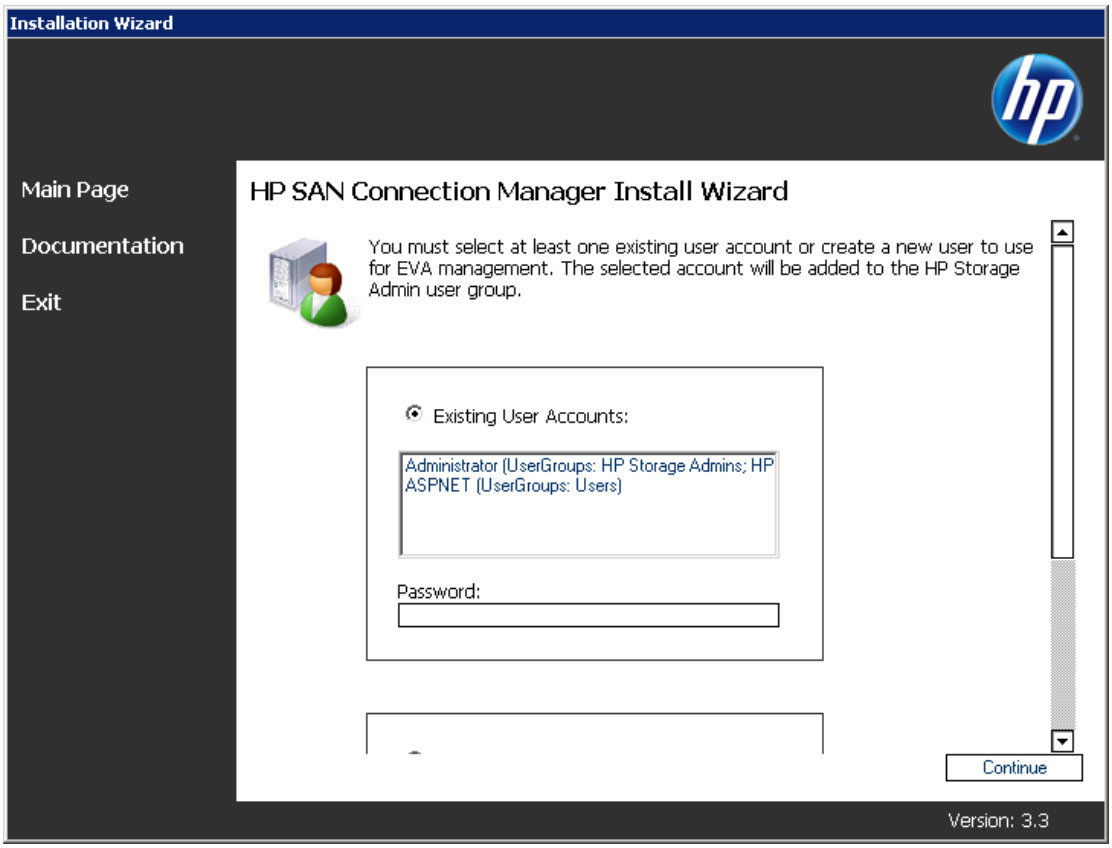

Figure 3 Installation wizard: Add EVA Management Account

8. Before installation can proceed, you must add a user account to the HP Storage Admin user group. (This step is not necessary for MSA storage.) Choose one of the following options:
   - If you do not already have any user accounts set up, create a user account now by completing the User name, Password, and Confirm Password boxes. Then click **Create User and Add to Group**.
   - If you already have one or more user accounts set up (for example, you may have set up accounts when you installed your EVA), select one to add to the HP Storage Admin group. Then click **Add To Group**.

     When prompted, enter a password for the existing user account, and then click **OK**.

   The selected user is added to the HP Storage Admin group and the Add EVA Management Account dialog box closes.
9. The Enable VCEM Discovery dialog box (Figure 4) enables you to view your blade enclosures in the topology *if* you have a configured VCEM server. Choose one of the following options:
   - Select the Enable VCEM Discovery check box, enter the VCEM server username, password, IP address, and then click **Set**.
   - Click **Skip** to leave VCEM discovery disabled and continue.

   The message "Your installation is complete" appears. Or, if any software components fail to install, the final installation window lists those components.
10. Click the **View Error Log** link to open an error log that provides additional information. You may be prompted to upgrade, add, or modify components for successful installation.
11. Remove the SAN Connection Manager CD, and then click **Reboot**.
12. Restart your computer to complete the installation process.

13. When you restart your computer, the system may report finding new hardware. If so, respond to these messages by clicking **Cancel**.

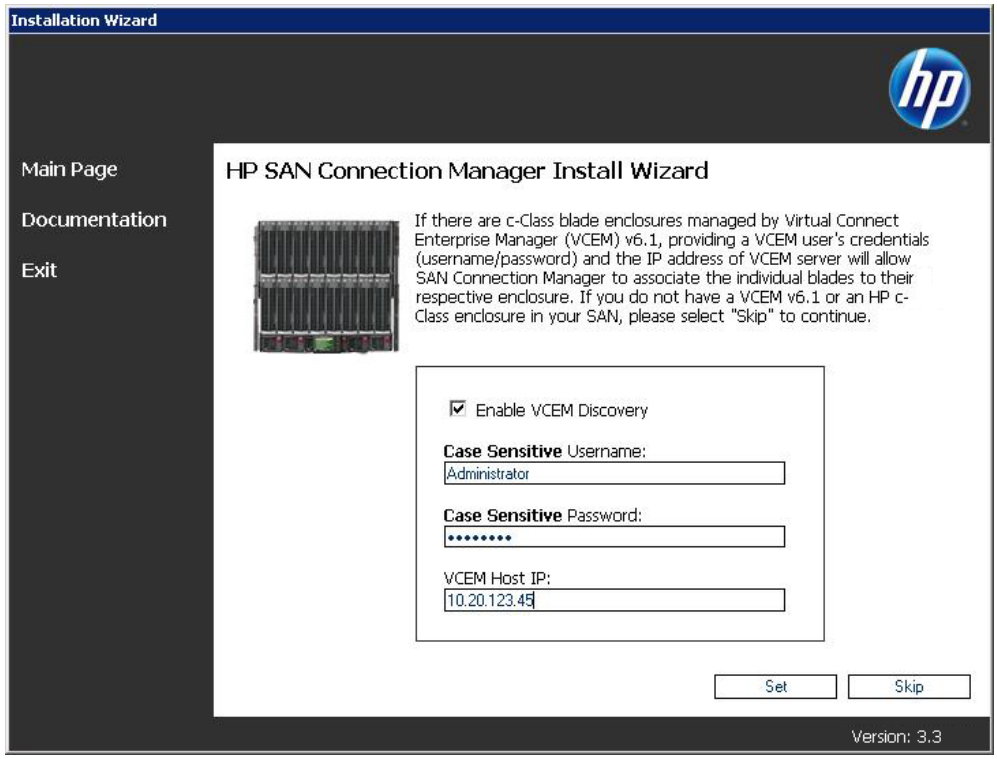

Figure 4 Installation wizard: Enable VCEM Server Enclosure Discovery

Repeat this procedure to install the software on additional Windows servers.

Linux installation: initial

Follow these steps to install the required software on servers running Linux.

NOTE: To configure servers using other operating systems or non-QLogic HBAs, see "Configuring SAN Connection Manager for HP-UX and Emulex HBAs," page 17.

To install the components required by SAN Connection Manager on Linux:

1. Insert the installation CD into the CD-ROM drive of the server.
   The installation CD should mount automatically in one of the following locations:

   ```
   /media/cdrom/
   /mnt/cdrom/
   /media/cdrecorder/
   ```

   If the installation CD is not mounted automatically, issue the following commands to mount the CD:

   ```
   # mkdir -p /mnt/cdrom
   # mount /dev/cdrom /mnt/cdrom
   ```

IMPORTANT: Under specific distributions, such as RHEL 5, the installation CD is auto-mounted using the following CD label:

```
# /media/HpInstallx.x/
```

If this occurs, the CD may get mounted with the `no execution` flag, causing the installation script to fail. Installation failure may be indicated by the following error message:

```
# ./install_smb.sh
```

The following is returned:

```
bash: ./install_smb.sh: /bin/sh: bad interpreter: Permission denied
```

The workaround is to manually mount the installation CD. For example, if the CD was auto-mounted in `/media/HpInstallx.x`, issue these commands to unmount, and then remount the CD:

```
# unmount /media/HpInstallx.x
# mkdir -p /mnt/cdrom
# mount /dev/cdrom /mnt/cdrom
```

If the `unmount` command fails with a busy warning, make sure that all applications and consoles that could be using the CD media are closed, and then try again.

2. Change directory to the `linux` directory. For example, if the installation CD is mounted in `/mnt/cdrom`, issue the following command:

   ```
   # cd /mnt/cdrom/HP_SSCM/linux/
   ```

3. Run the `install_smb.sh` script as follows:

   ```
   # ./install_smb.sh
   ```

   This will install the following components:

   - QLogic FC HBA driver (only updated on RH4, Suse 9, and RH5.2)
   - HP Array Configuration Utility
   - QLogic SANsurfer agent, QLRemote (if possible, the installation program will also start the SANsurfer agent, QLRemote)

4. If the following message appears at the end of the installation, you must restart the computer, otherwise, continue with step 6:

   ```
   New driver and qlremote installed but not active.
   For new driver and qlremote to be active either:
   Reboot the system (Mandatory in case of Boot From SAN)
   or
   Stop all the applications using QLogic driver.
   Unload QLogic driver by executing following command:
   # modprobe -r qla2XXX (ex. qla2300, qla2400)
   Reload new driver by executing following command:
   # modprobe -v qla2xxx
   Start qlremote as follows:
   # /etc/init.d/qlremote start
   Rebooting the system will automatically load new driver and start qlremote.
   ```

5. To install the Linux driver with FDMI enabled (by default, FDMI is disabled), issue the following command:

   ```
   # modprobe -v qla2xxx ql2xfdmienable=1
   ```

6. To verify that the installation completed, check the FC HBA driver version:
   a. To ensure that the driver is installed in the correct location, issue the following command:

      ```
      # modinfo qla2xxx
      ```

      The following is returned:

      ```
      Filename: /lib/modules/2.6.9-55.ELsmp/kernel/drivers/scsi/qla2xxx/qla2xxx.ko
      Version: 8.02.23 653675A771C3619AEEA4E9A
      ```

   b. To verify that the driver is loaded, issue the following command:

      ```
      # lsmod | grep qla2xxx
      ```

      The following is returned:

      ```
      qla2xxx_conf  303752  1
      qla2xxx       982688  0
      scsi_mod      445298  qla2xxx
      ```

   c. To verify that the correct driver is loaded, issue the following command:

      ```
      # cat /proc/scsi/qla2xxx/* | grep "Driver version"
      ```

      The following is returned:

      ```
      Firmware version: 3.03.25 IPX
      Driver version: 8.02.23-fo
      ```

Configuring SAN Connection Manager for HP-UX and Emulex HBAs

SAN Connection Manager is compatible with the HP-UX operating system and Emulex HBAs when configured as described in this section.

HP-UX configuration

SAN Connection Manager can manage all of your supported HP-UX servers. The HP-UX operating system provides native software drivers for the HP FC HBAs. For the application to properly identify your server(s), you must manually enter the FDMI information when the application prompts for it. For more information, see "Manually entering FDMI information," page 80.

Emulex HBA configuration

SAN Connection Manager can manage all of your supported Windows and Linux servers that have Emulex HBAs installed. In order for the application to properly identify your server(s), you must set the `EnableFDMI` parameter on the Emulex HBA. Use the HBAnyware software to set the `EnableFDMI` parameter to a value of **2**.

For detailed instructions on how to enable the FDMI parameter on your Emulex HBA, see your HBA documentation.

If FDMI is not enabled on the HBA, SAN Connection Manager will prompt you to manually enter the FDMI information. For more information, see "Manually entering FDMI information," page 80.

Installing SAN Connection Manager: upgrade installation

Use the HP SAN Connection Manager CD to upgrade a previous installation of the management software on your management station as described in "Windows installation: upgrade," page 18. Then use the same CD to upgrade the HBA driver and other required software on each of the other servers in your SAN. Depending on the server operating system for the non-management station installations, refer to either the steps for "Windows installation: upgrade," page 18 or "Linux installation: upgrade," page 22.

Windows installation: upgrade

Follow these steps to upgrade a previous installation of the SAN Connection Manager software on your management station, or to upgrade the required non-management software on all other servers running Windows.

To upgrade SAN Connection Manager on Windows:

1. Insert the installation CD into your computer's CD-ROM drive.

   The HP Installation Wizard starts automatically. (If the installer does not start automatically, run `Setup.exe` from the installation CD.)

   The initial installation upgrade window (Figure 5) opens.

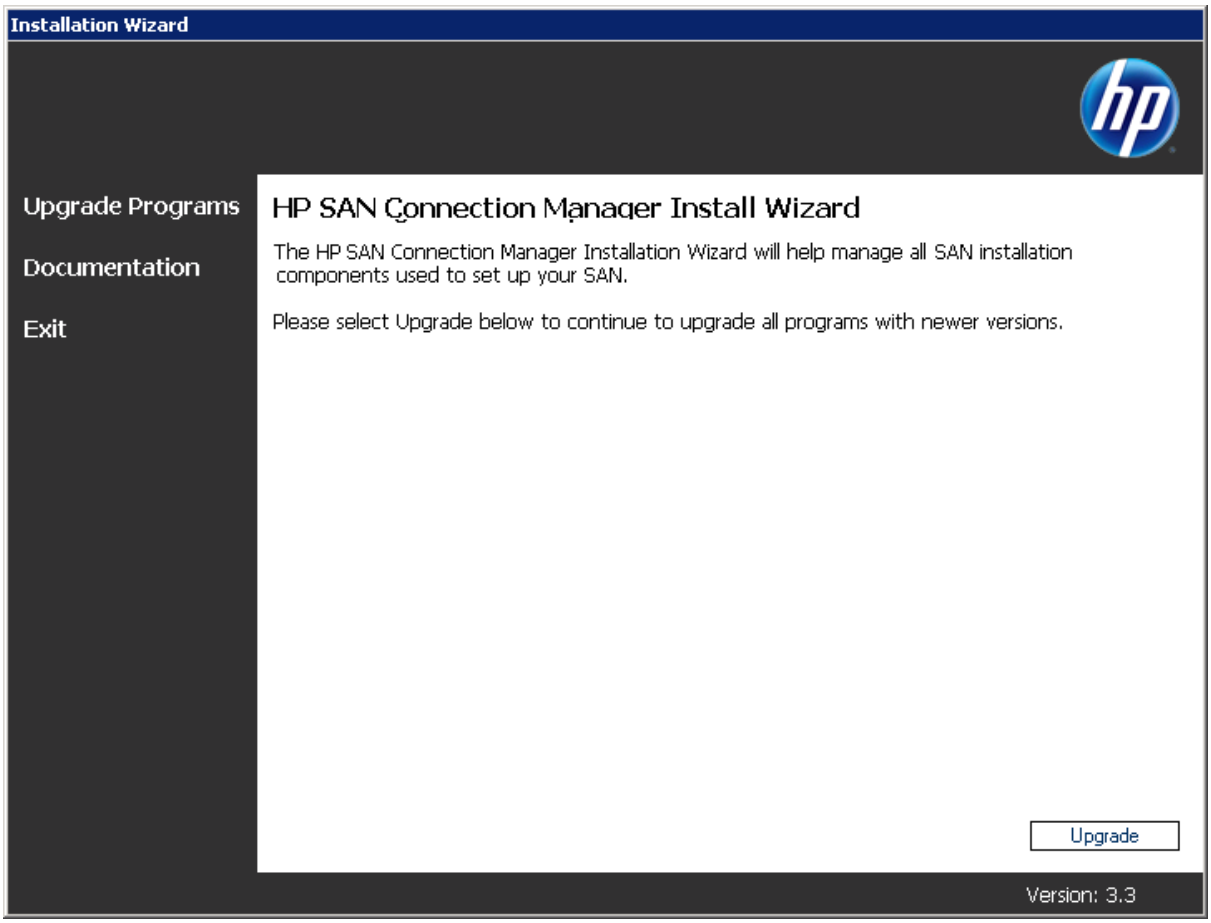

Figure 5 Installation upgrade wizard: initial window

2. Click **Upgrade**.

   A message box prompts you to confirm that you want to upgrade an existing version of SAN Connection Manager.

3. To continue with the upgrade, click **Yes**.

   The end user license agreement appears.

4. Read the text of the HP end user license agreement, and then either click **Agree** to start the software upgrade or **Disagree** to cancel the upgrade.

   The installation upgrade checking components window opens while the wizard looks for components that cannot be upgraded.

   The installation progress window appears briefly, and then the Available Storage Subsystem dialog box (Figure 6) prompts you to select the type of HP storage subsystem for this station.

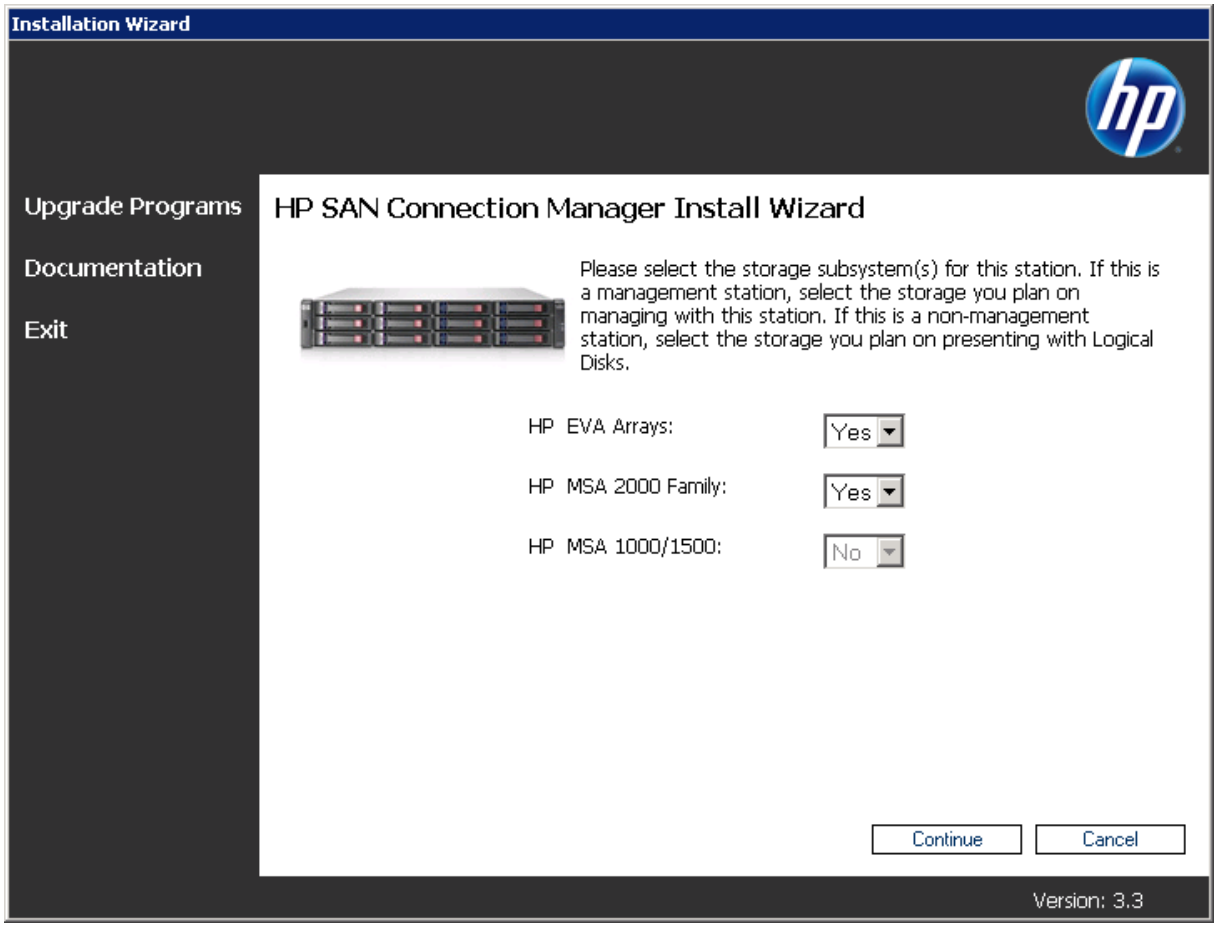

Figure 6 Installation upgrade wizard: Available Storage Subsystem

5. Select one or more storage subsystems types (EVA and/or MSA) that exist in your SAN by choosing **Yes** from the drop-down menu for the appropriate subsystem types. Then click **OK** to close this dialog box and continue the upgrade.

   The upgrade progress window appears. The progress window monitors the installation upgrade. A progress bar shows the percent of the upgrade completed and icons show the status of each component as it is upgraded, for example:

   - A icon indicates a component previously installed for SAN Connection Manager.
   - A icon indicates a previously installed component that has now been successfully upgraded.
   - A icon indicates either that the component was not previously installed but will be installed with the upgrade, or that a previously installed component was removed manually using the Windows Add/Remove Programs utility.
   - A icon indicates that an error occurred during upgrade of this component. (The final wizard window will provide additional information about component installation upgrade errors.)

   After the FC driver is installed, a diagnostic window shows the HBA properties and targets found.

6. Click **OK** to close the SAN diagnostics window and continue.

   If you are upgrading the SAN Connection Manager software component on a system with EVA storage, the Add EVA Management Account dialog box (Figure 7) prompts you to either select an existing user account or to create a user account to manage your EVA.

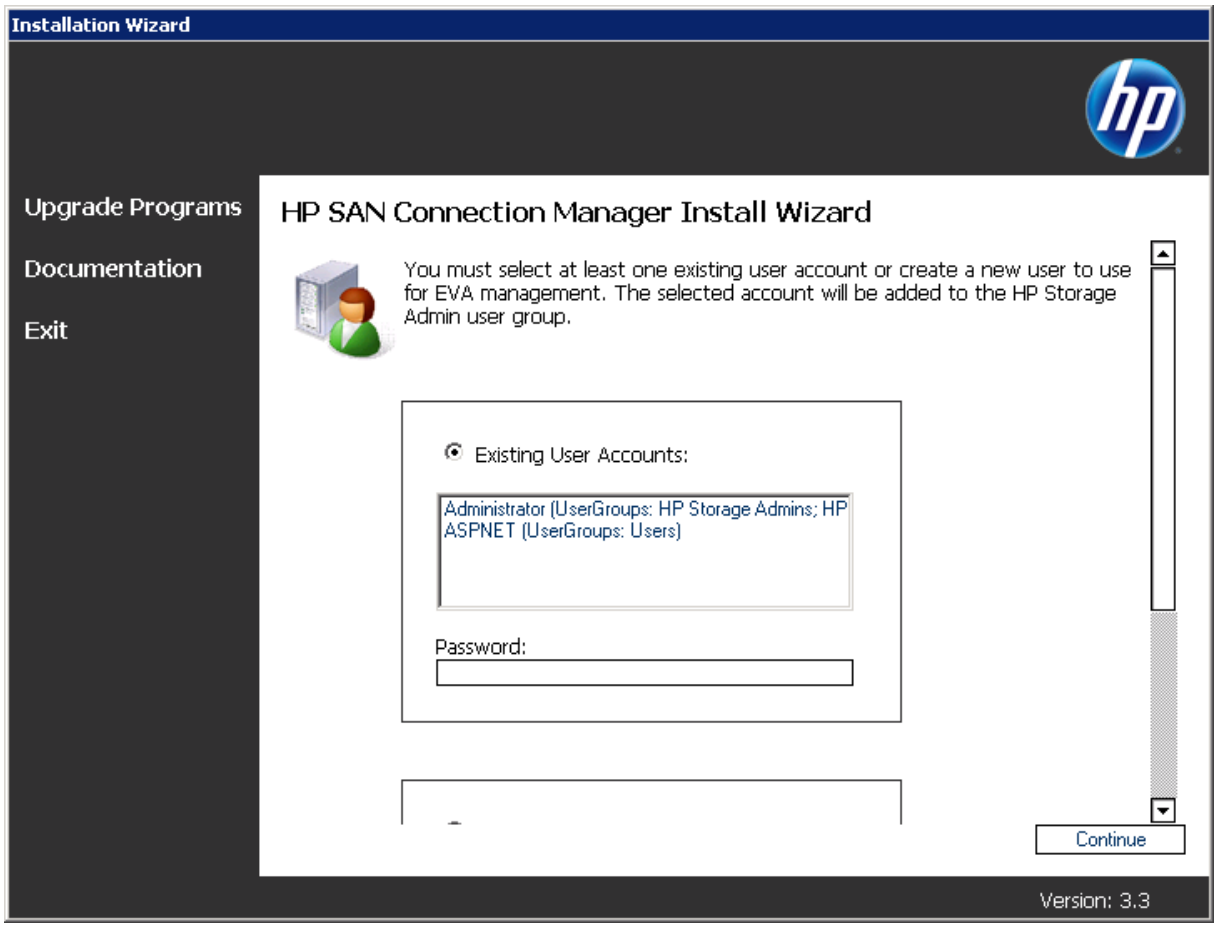

Figure 7 Installation upgrade wizard: Add EVA Management Account

7. Before the installation upgrade can proceed, you must add a user account to the HP Storage Admin user group. (This step is not necessary for MSA storage.) Choose one of the following options:
   - If you already have one or more user accounts set up (for example, you may have set up accounts when you installed your EVA), select one to add to the HP Storage Admin group. Then click **Add To Group**.
   - If you do not already have any user accounts set up, create a user account now by completing the User name, Password, and Confirm Password boxes. Then click **Create User and Add to Group**.

   The selected user is added to the HP Storage Admin group and the Add EVA Management Account dialog box closes.

   The message "Your upgrade is complete" appears.

   Or, if any software components fail to install, the final installation upgrade window (Figure 8) lists failed components.

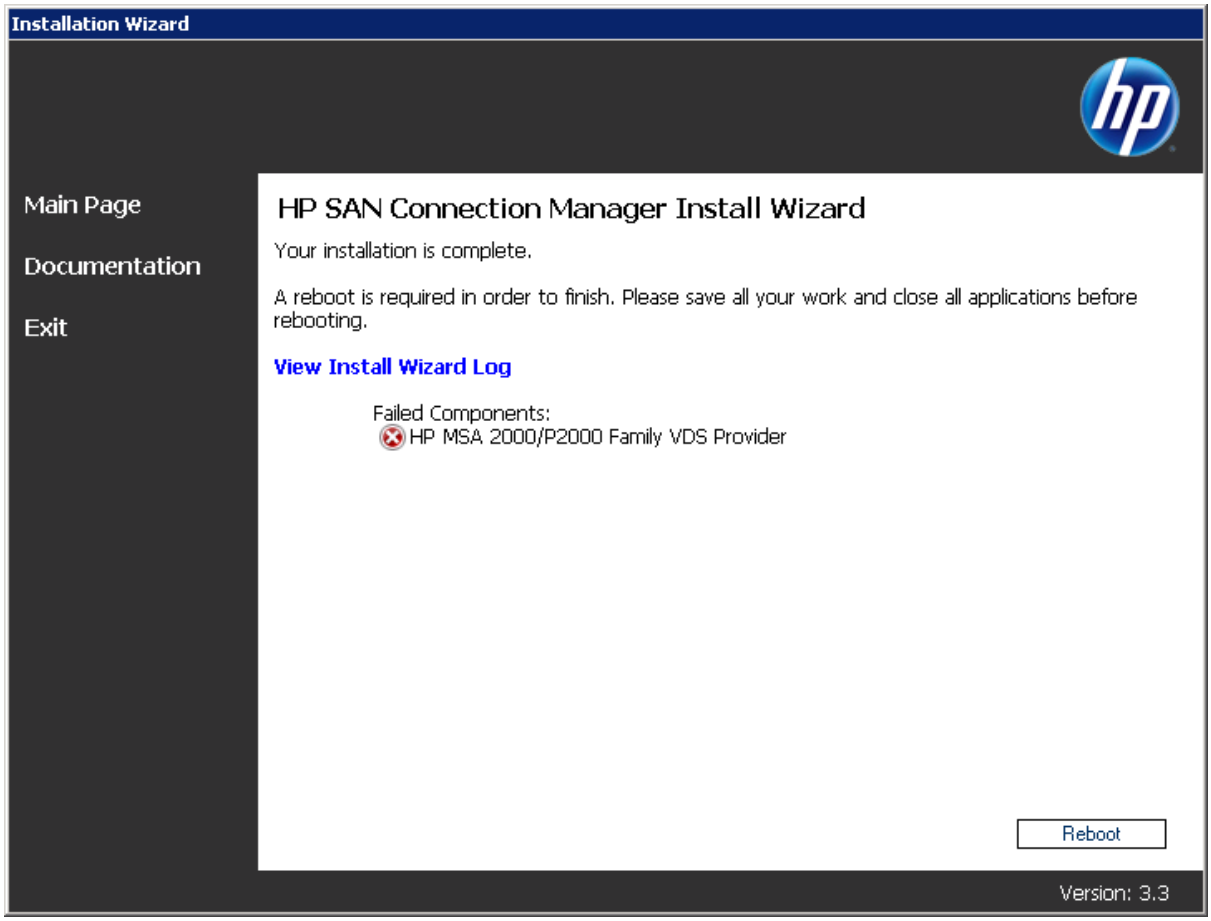

Figure 8 Installation upgrade wizard: finished with errors

8. Click the **View Error Log** link to open an error log that provides additional information. You may be prompted to upgrade, add, or modify components for successful installation.
9. Remove the SAN Connection Manager CD, and then click **Reboot**.
10. Restart your computer to complete the installation process.
11. When you restart your computer, the system may report finding new hardware. If so, respond to these messages by clicking **Cancel**.

Repeat this procedure to upgrade the software on additional Windows servers.

Linux installation: upgrade

Follow these steps to upgrade a previous installation of the required software on servers running Linux.

To upgrade the components required by SAN Connection Manager on Linux:

1. Insert the installation CD into the CD-ROM drive of the server.

   The installation CD should mount automatically in one of the following locations:

   ```
   /media/cdrom/
   /mnt/cdrom/
   /media/cdrecorder/
   ```

   If the installation CD is not mounted automatically, issue the following commands to mount the CD:

   ```
   # mkdir -p /mnt/cdrom
   # mount /dev/cdrom /mnt/cdrom
   ```

   IMPORTANT: Under specific distributions, such as RHEL 5, the installation CD is auto-mounted using the following CD label:

   ```
   # /media/HpInstallx.x/
   ```

   If this occurs, the CD may get mounted with the `no execution` flag, causing the installation script to fail. Installation failure may be indicated by the following error message:

   ```
   # ./install_smb.sh
   ```

   The following is returned:

   ```
   bash: ./install_smb.sh: /bin/sh: bad interpreter: Permission denied
   ```

   The workaround is to manually mount the installation CD. For example, if the CD was auto-mounted in `/media/HpInstallx.x`, issue these commands to unmount, and then remount the CD:

   ```
   # unmount /media/HpInstallx.x
   # mkdir -p /mnt/cdrom
   # mount /dev/cdrom /mnt/cdrom
   ```

   If the `unmount` command fails with a busy warning, make sure that all applications and consoles that could be using the CD media are closed, and then try again.

2. Change directory to the `linux` directory. For example, if the installation CD is mounted in `/mnt/cdrom`, issue the command:

   ```
   # cd /mnt/cdrom/HP_SSCM/linux/
   ```

3. Run the `install_smb.sh` script as follows:

   ```
   # ./install_smb.sh
   ```

   This will install the following components:

   - QLogic FC HBA driver (only updated on RH4, Suse 9, and RH5.2)
   - HP Array Configuration Utility
   - QLogic SANsurfer agent, QLRemote (if possible, the installation program will also start the SANsurfer agent, QLRemote)

4. If the following message appears at the end of the installation, you must restart the computer, otherwise, continue with step 5:

```
New driver and qlremote installed but not active.
For new driver and qlremote to be active either:
Reboot the system (Mandatory in case of Boot From SAN)
or
Stop all the applications using QLogic driver.
Unload QLogic driver by executing following command:
# modprobe -r qla2XXX (ex. qla2300, qla2400)
Reload new driver by executing following command:
# modprobe -v qla2xxx
Start qlremote as follows:
# /etc/init.d/qlremote start
Rebooting the system will automatically load new driver and start qlremote.
```

5. To verify that the installation completed, check the FC HBA driver version:
   a. To ensure that the driver is installed in the correct location, issue the following command:

      ```
      # modinfo qla2xxx
      ```

      The following is returned:

      ```
      Filename: /lib/modules/2.6.9-55.ELsmp/kernel/drivers/scsi/qla2xxx/qla2xxx.ko
      Version: 8.02.23 653675A771C3619AEEA4E9A
      ```

   b. To verify that the driver is loaded, issue the following command:

      ```
      # lsmod | grep qla2xxx
      ```

      The following is returned:

      ```
      qla2xxx_conf  303752  1
      qla2xxx       982688  0
      scsi_mod      445298  qla2xxx
      ```

   c. To verify that the correct driver is loaded, issue the following command:

      ```
      # cat /proc/scsi/qla2xxx/* | grep "Driver version"
      ```

      The following is returned:

      ```
      Firmware version: 3.03.25 IPX
      Driver version: 8.02.23-fo
      ```

Removing SAN Connection Manager

SAN Connection Manager uses the installation wizard to remove all components currently installed. You must reboot your computer following program removal. Follow the procedure for removing SAN Connection Manager from Windows "Removing SAN Connection Manager in Windows," page 24 or Linux "Removing SAN Connection Manager in Linux," page 25.

Removing SAN Connection Manager in Windows

Follow these steps to remove the SAN Connection Manager software from a server running Windows.

1. Insert the installation CD into your computer's CD-ROM drive.
   The HP Installation Wizard starts automatically.
   The initial installation window (Figure 9) opens.

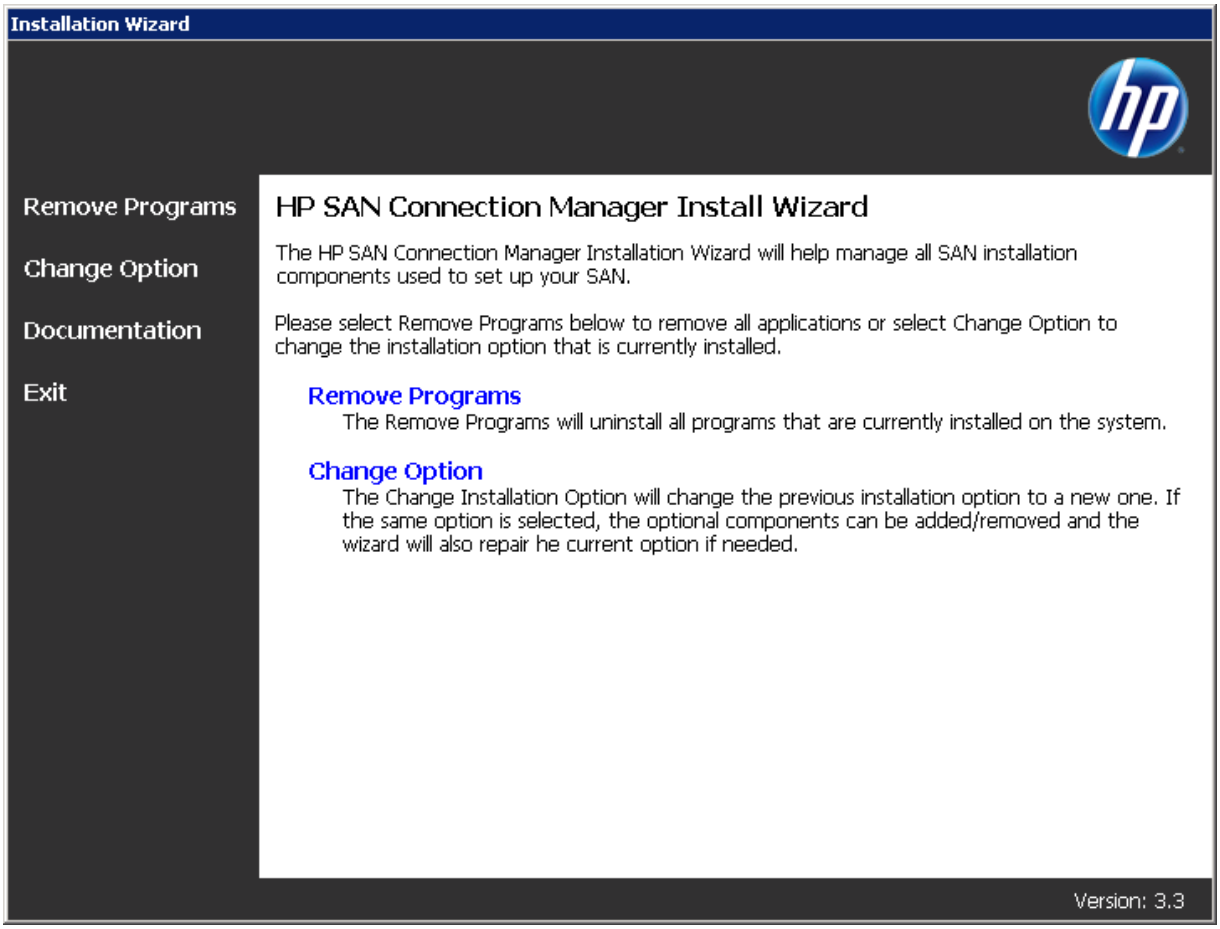

Figure 9 Installation wizard: initial window for program removal

2. Click **Remove Programs**.
   A message box asks if you are sure you want to remove the program.
3. Click **Yes** to proceed with program removal, or **No** to cancel.
   The program removal progress window opens and monitors the product removal. A progress bar shows the percent of the uninstallation completed and icons show the status of each component as it is removed, for example:
   - A icon next to the component name indicates successful removal.
   - A icon next to the component indicates that it has not yet been removed.
   - A icon indicates that an error occurred during removal of this component.

   When program removal is complete, you must reboot the computer.
4. Remove the SAN Connection Manager CD from the CD-ROM drive.
5. Ensure that all running programs are closed, and then click **Reboot** to restart the computer.

Removing SAN Connection Manager in Linux

Follow these steps to remove the SAN Connection ManagerSAN Connection Manager software on a server running Linux.

△ **CAUTION:** If the system is booted from your SAN using the QLogic FC HBA driver, use the Linux uninstallation option cautiously. Your QLogic FC HBA drivers will also be removed from the system, thus making it un-bootable because the drivers are removed from the Linux initial RAM disk (initrd), the temporary file system used by the Linux kernel during boot.

---

1. Insert the installation CD into the CD-ROM drive of the server. The installation CD should mount automatically in one of the following locations:

   ```
   /media/cdrom/
   /mnt/cdrom/
   /media/cdrecorder/
   ```

   If the installation CD is not mounted automatically, then issue the following commands to mount the CD:

   ```
   # mkdir -p /mnt/cdrom
   # mount /dev/cdrom /mnt/cdrom
   ```

2. Change directory to the `linux` directory. For example, if the installation CD is mounted in `/mnt/cdrom`, issue the following command:

   ```
   # cd /mnt/cdrom/HP_SSCM/linux/
   ```

3. Run the `install_smb.sh` script with the `uninstall` option as follows:

   ```
   # ./install_smb.sh --uninstall
   ```

   This will remove the following components:

   - QLogic FC HBA Driver
   - HP Array Configuration Utility, if installed
   - QLogic SANsurfer agent, QLRemote, if installed

3 Getting Started

This chapter covers basic information to help you start using SAN Connection Manager.

Understanding the user interface

The SAN Connection Manager interface (Figure 10) is designed for ease of use, quick access to the most frequently used functions, and utilizing basic Windows conventions.

Application window

The SAN Connection Manager window consists of the following main components: a menu bar (see "Menu bar," page 28), a toolbar (see "Toolbar," page 31), and a window containing two panes:

- A *navigation pane* (tree view) on the left side shows a graphical hierarchy of your subsystems, LUNs, and servers. The information in the navigation pane depends on the view you select on the bottom of the navigation pane: either Server-Storage View or Storage subsystem-Logical Disk View.
- A *content pane* on the right side provides graphical representations of your SAN. Depending on what component you select in the navigation pane, the content pane contains different representations, including the Physical Connection map, LUN Assignment map, as well as detailed information about your subsystems, LUNs, servers, and volumes.

Figure 10 shows an example of the application window.

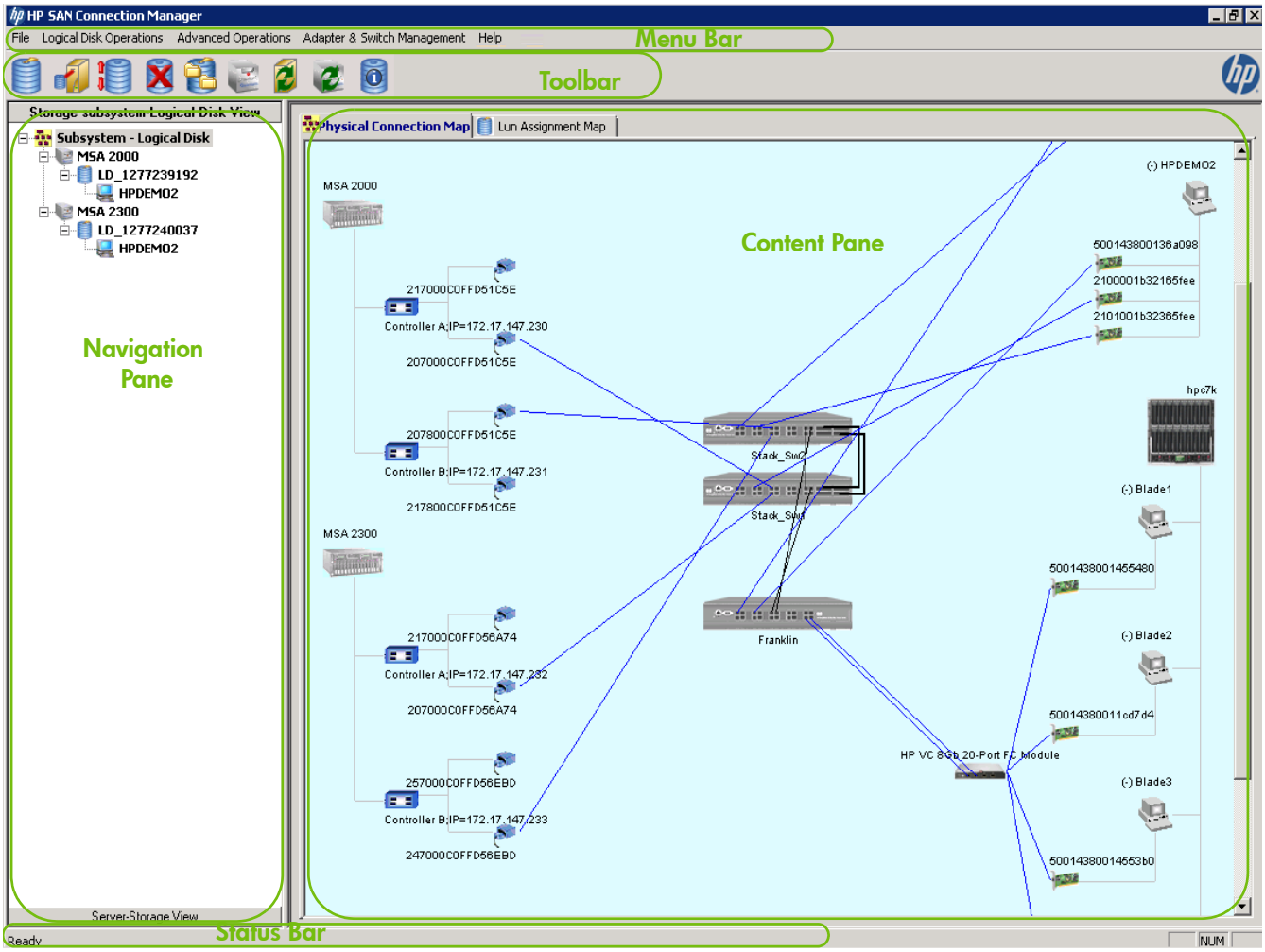

Figure 10 SAN Connection Manager user interface

Menu bar

The SAN Connection Manager menu bar contains the following menus, each of which is described in detail in this section. Shortcut key combinations are displayed in the menus, and provide an alternative way of selecting menu bar items.

items are also available using the menus.

- "File menu," page 28
- "Logical Disk Operations menu," page 28
- "Advanced Operations menu," page 29
- "Adapter & Switch Management menu," page 30
- "Help menu," page 30

File menu

Table 1 provides a brief description of the items on the File menu and a reference to more detailed information.

Table 1 File menu

Menu Item	Purpose	See
Save current SAN connection	Saves a graphical topology of your SAN to reference against any changes made to your system	"Saving the current configuration," page 44.
Compare current and previous SAN connection	Shows a graphical representation listing new servers, HBAs, switches, and subsystems, as well as removed switches and subsystems	"Comparing configurations," page 45.
Event Log	Displays a list of all SAN Connection Manager-initiated actions and the results for the host, HBAs, switches, and storage subsystem arrays	"Viewing the event log," page 43.
Exit	Closes the SAN Connection Manager application	—

Logical Disk Operations menu

Table 2 provides a brief description of the items on the Logical Disk Operations menu and a reference to more detailed information.

Table 2 Logical Disk Operations menu

Menu Item	Purpose	See
Create New Logical Disk	Opens a wizard to create a logical disk from the storage subsystem	"Creating a logical disk—EVA storage," page 84 and "Creating a logical disk—MSA storage," page 88.
Present (Un-present) Logical Disk to Server	Assigns a logical disk to a server, or unassigns it (removes access) from the server	"Assigning and unassigning a logical disk to a server," page 95.
Expand Logical Disk	Increases the capacity of one or more logical disks	"Expanding a logical disk," page 97.
Delete Logical Disk	Removes a logical disk from the storage subsystem	"Deleting a logical disk," page 98.

Advanced Operations menu

Table 3 provides a brief description of the items on the Advanced Operations menu and a reference to more detailed information.

Table 3 Advanced Operations menu

Menu Item	Purpose	See
Create & Manage Partition	Initializes a new disk; creates, modifies, or deletes partitions of initialized disks	"Creating and managing partitions," page 105.
Refresh the Server List	Discovers new, removed, and changed servers, and updates the current topology of your SAN shown in the Physical Connection and LUN Assignment maps based on those discoveries	"Refreshing the server list," page 103.
Refresh the Storage Subsystem List	Discovers any status change in the subsystem's drives, controllers, and logical disks, and updates the current topology of your SAN shown in the Physical Connection and LUN Assignment maps	"Refreshing the storage subsystem list," page 125.
Change Discovery Refresh Interval	User-configured number specifying the amount of time to wait before the application automatically polls the system for the most current information	"Changing the discovery refresh intervals," page 125
Edit Manual FDMI List	Manually configures the HBA's host name and OS type	"Manually entering FDMI information," page 80.
Manage Storage Subsystem	Manages the controller(s) and individual drives that comprise a selected subsystem	"Managing storage subsystems," page 122.
Configuration Using Application Templates	Configures a new storage subsystem using a pre-defined application template or custom deployment	"Configuring a storage subsystem," page 127.
VCEM Configuration	Enables VCEM discovery of managed c-Class Enclosures	"Viewing VCEM information," page 115
Check for Updates	Searches the HP website for updates to HBA drivers, switch firmware, storage subsystem firmware, and storage subsystem application templates. If updates are found, the Updated Components dialog box prompts you to download the updates.	—

Adapter & Switch Management menu

Table 4 provides a brief description of the items on the Adapter & Switch Management menu and a reference to more detailed information.

Table 4 Adapter & Switch Management menu

Menu Item	Purpose	See
Set Server Agent Password	Changes the password for accessing the selected server	"Setting a server agent password," page 104.
Update HBA BIOS	Updates the selected HBA with a new BIOS image file	"Updating an HBA BIOS image," page 76.
Update HBA Driver	Updates drivers for HBAs within your SAN	"Updating an HBA driver," page 78.
Get Switch Properties	Displays switch information	"Viewing switch properties," page 47.
Get Switch Zoning Information	Displays switch zones and members	"Viewing switch zoning information," page 50.
Set Switch Admin Password	Changes the administrator password for accessing the switch	"Setting the switch admin password," page 53.
Get Network Properties	Displays network information	"Viewing network properties," page 48.
Set Switch IP Address	Changes the switch IPv4 or IPv6 address	"Setting the switch IP address," page 54.
Set Switch IPsec Information	Manages a list of IP security associations and policies	"Setting switch IP security," page 63
Update Switch Firmware	Updates the switch with a new firmware image file	"Updating switch firmware," page 56.
Set Switch Symbolic Name and/or Domain ID	Changes the symbolic name and domain ID for the switch	"Setting the switch symbolic name and domain ID," page 61.
Set Switch HBA-based Default Zoning	Sets a switch default zone and includes or excludes a device from a zone	"Setting the switch default zoning," page 51.
Set Switch SNMP Properties	Defines how authentication traps are managed and set for the switch	"Setting switch SNMP properties," page 58.
Set DNS Properties	Enables or disables the DNS client on the switch, and configures DNS on the switch	"Setting DNS properties," page 62

Help menu

Table 5 provides a brief description of the items on the Help menu and a reference to more detailed information.

Table 5 Help menu

Menu Item	Purpose	See
Contents	Opens the SAN Connection Manager help system	"Using the help system," page 31.
About the application	Opens the About box that shows the version of SAN Connection Manager installed, and the hardware and software provider list	—

Toolbar

The SAN Connection Manager toolbar provides buttons for easy access to some of the application's most used functions, as well as information about the application. Table 6 shows each of the toolbar buttons and what they do.

Table 6 Toolbar buttons

Button	Purpose
	Create a logical disk
	Assign a logical disk to a server
	Expand a logical disk
	Delete a logical disk
	Create and manage partitions
	Manage the storage subsystem
	Refresh the server list
	Refresh the subsystem list
	Open the About box

Using the help system

The SAN Connection Manager's help system provides quick access to information about performing tasks and completing dialog boxes.

To access the help system from SAN Connection Manager, choose one of the following options:

- On the Help menu, click **Contents**.
- To view a help topic related to the current dialog box or window, click the **Help** button or press the **F1** key.

The help system's left pane contains the following tabs:

- The Contents tab shows a structured presentation of help topics. In Contents view, the following icons are associated with topics:
  - A book icon indicates a major grouping containing subordinate topics. Click a book icon to "open" the book and see individual topics that belong to that group.
  - A topic icon indicates a help topic. Click a topic icon to view the topic's contents in the right pane.
- The Index tab shows an alphabetical listing of keywords associated with the help topics. You can either scroll through the list to find keywords, or enter a keyword to search for the topic. Then you can choose from the one or more topics associated with that keyword.
- The Search tab enables you to quickly find a topic containing one or more words. Just type the text you want to search for, and then click **List Topics**. To customize your search, select any of the check boxes in the lower-left corner.

- The Favorites tab provides a place for you to save a list of topics you find useful or return to frequently. To add the topic you are currently viewing to your list of favorites, click the **Favorites** tab, and then click **Add**.

To print a help topic:

1. Find and open the help topic you want, or highlight a book or topic on the Contents tab.
2. On the help Options menu, click **Print**.
3. Select the printing options for your printer, and then click **Print**.

To return to previous topics:

- To return to a topic you have visited previously, click **Back**. To mark frequently used topics, click **Favorites**, and then click **Add**.

Starting SAN Connection Manager

Follow these steps to start SAN Connection Manager. You will need to perform some of these steps only the first time you start the application.

To start SAN Connection Manager:

1. To launch the application, choose one of the following options:
   - Click **Start**, point to **All Programs > Hewlett-Packard > HP SAN Connection Manager**, and then click **HP SAN Connection Manager**.
   - Double-click the desktop shortcut:

   If this is the first time you have launched this software for a new, uninitialized EVA subsystem or an unconfigured MSA subsystem, the installer prompts you to configure it.
2. Choose one of the following options:
   - Click **Yes** to configure the subsystem using the Storage Deployment wizard (see "Configuring a storage subsystem," page 127).
   - Depending on the type of subsystem you have, click **No** to either:
     - Initialize an EVA subsystem. Continue with step 3.
     - Ignore initialization of an MSA subsystem; it is not required. Skip to step 4

If this is not the first time you have launched this software, or if your storage subsystem is HP EVA and you chose **No** in step 2, the Initialize an EVA Storage Subsystem dialog box (Figure 11) opens.

If this is not the first time you have launched this software, or if your storage subsystem is HP MSA and you chose **No** in step 2, go to step 4.

NOTE: If the software detects that another server is managing your EVA storage array, a message box asks if you want to disable that server and take over management of the EVA from this server. Click **Yes** to proceed.

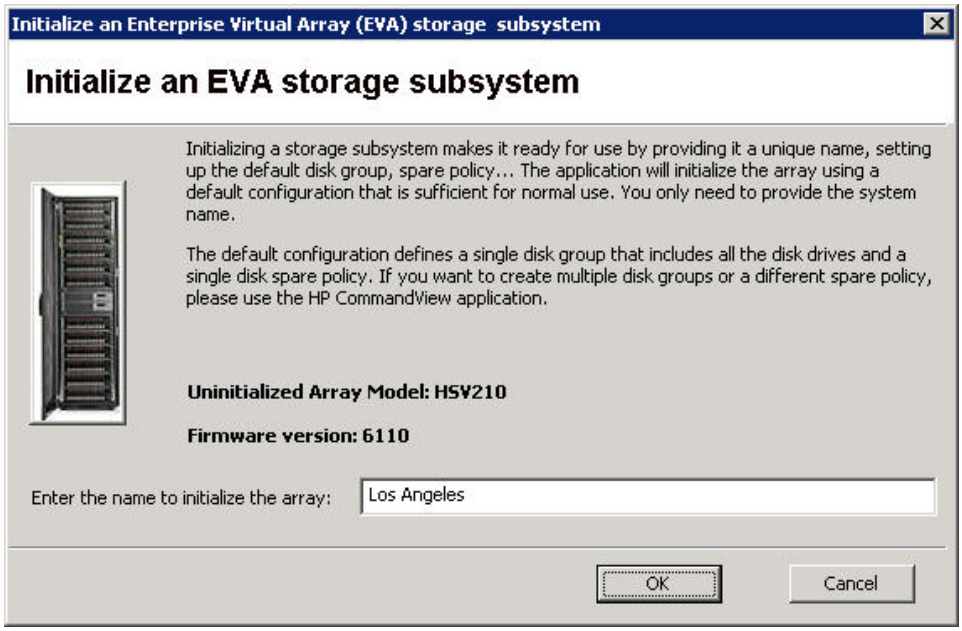

Figure 11 Initialize an Enterprise Virtual Array (EVA) Storage Subsystem dialog box

3. Enter a name to identify this new storage subsystem array, and then click **OK** to initialize the subsystem using the default configuration. (This step is not required for MSA storage.)
4. Wait while the application discovers (detects) switches, servers, storage subsystems, and logical disks. This may take a few minutes.

If the application detects a new, unconfigured switch in your SAN, the New Switch Setup dialog box (Figure 12) opens.

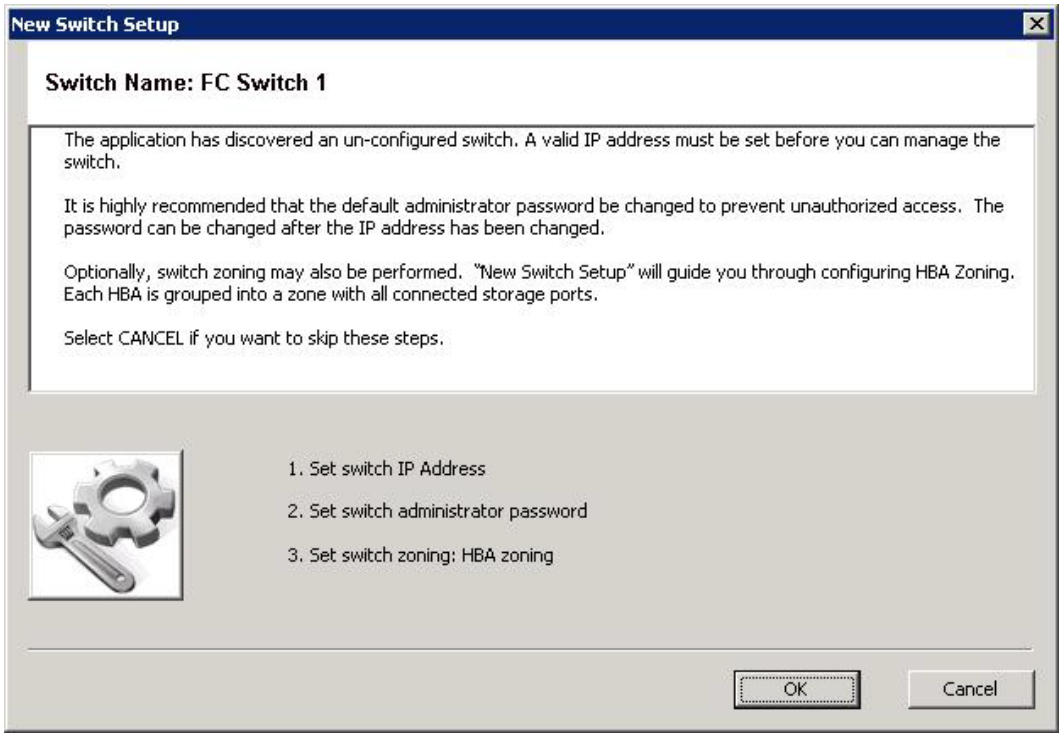

Figure 12 New Switch Setup dialog box

The New Switch Setup dialog box prompts you to set up the new switch by completing these three steps:

1. Set switch IP address
2. Set switch administrator password
3. Set switch zoning: HBA zoning

5. Choose one of the following options:
   - To continue with the first step (setting the switch IP address), click **OK**. The Set Switch IP Address dialog box (Figure 13) opens. Go to step 6.
   - To skip the switch setup for now, click **Cancel**. (To set up the switch later, see the procedures in "Managing Switches," page 47. If you do not complete switch set up before you exit SAN Connection Manager, the New Switch Setup dialog box will open again the next time you start the application.)

   The Set Switch IP Address dialog box (Figure 13) shows the switch name and default IP address.

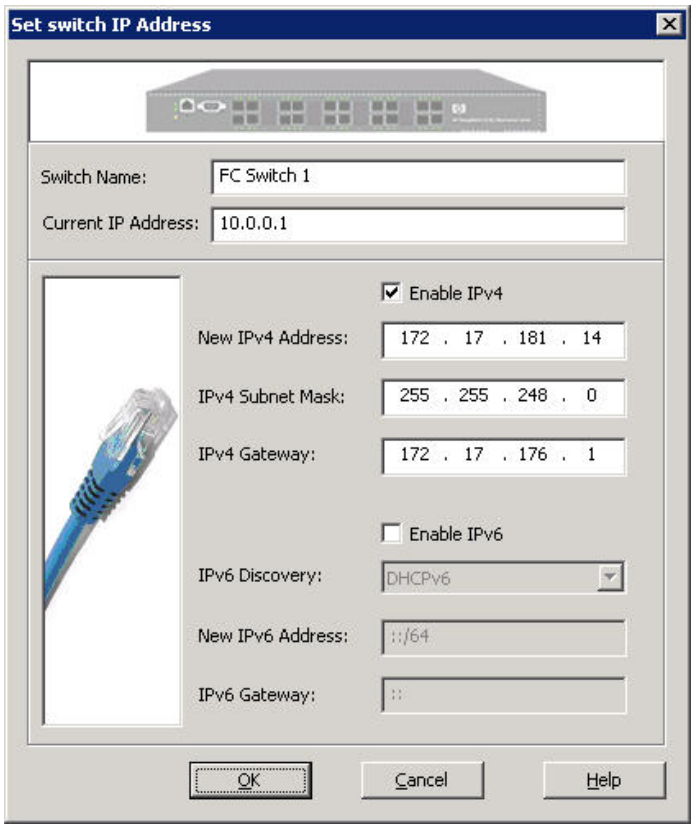

Figure 13 Set Switch IP Address dialog box: new switch setup

6. Select either the **Enable IPv4** or **Enable IPv6** check box, and then complete the appropriate IPv4 or IPv6 information (for details, see "Setting the switch IP address," page 54). Click **OK**.

   The New Switch Setup dialog box shows a check mark next to the first step, "Set switch IP address," (Figure 14) indicating that you have completed that task.

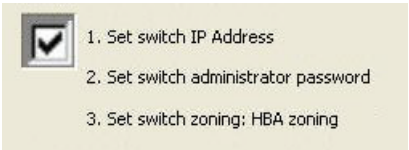

Figure 14 First step of New Switch Setup completed

7. A message box asks if you want to change the factory default switch administrator password. Choose one of the following options:
   - To continue with the next step of switch setup, click **Yes**. The Set Switch Admin Password dialog box (Figure 15) opens. Go to step 8.
   - To change the default password later, click **No**. (See "Setting the switch admin password," page 53, for a procedure for changing the switch admin password—either the default or the current password—to a new password.)

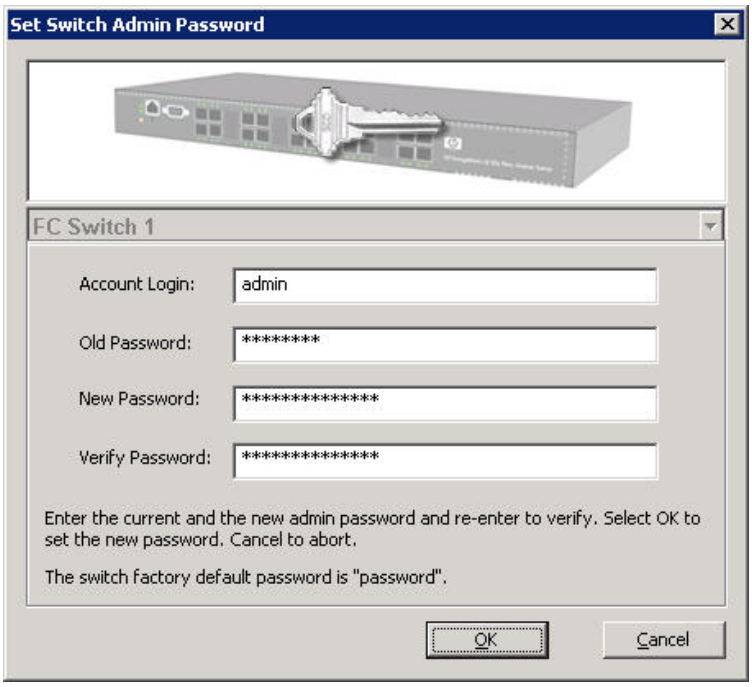

Figure 15 Set Switch Admin Password dialog box: new switch setup

8. In the Set Switch Admin Password dialog box, complete the following steps:
   a. Enter the Old Password (the factory default password for the switch is *password*).
   b. Enter a New Password (at least 8 alphanumeric characters).
   c. Re-enter the new password in the Verify Password box.
   d. To set the switch admin password, click **OK**. To cancel password setup, click **Cancel**.
9. A message box confirms successful password change completion. Click **OK** to close the message box.
   The New Switch Setup dialog box shows a check mark next to the second step, "Set switch administrator password," (Figure 16) indicating that you have completed that task.

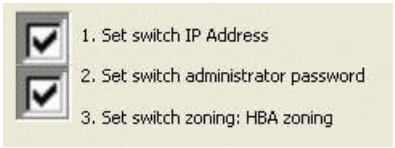

Figure 16 Second step of New Switch Setup completed

10. A message box asks if you want to set the switch zoning. Choose one of the following options:
    - To continue with the next step of switch setup, click **Yes**. The Set the Switch Default Zoning dialog box (Figure 17) opens. Go to step 9.
    - To set the switch zoning later, click **No**. (See "Setting the switch default zoning," page 51.)

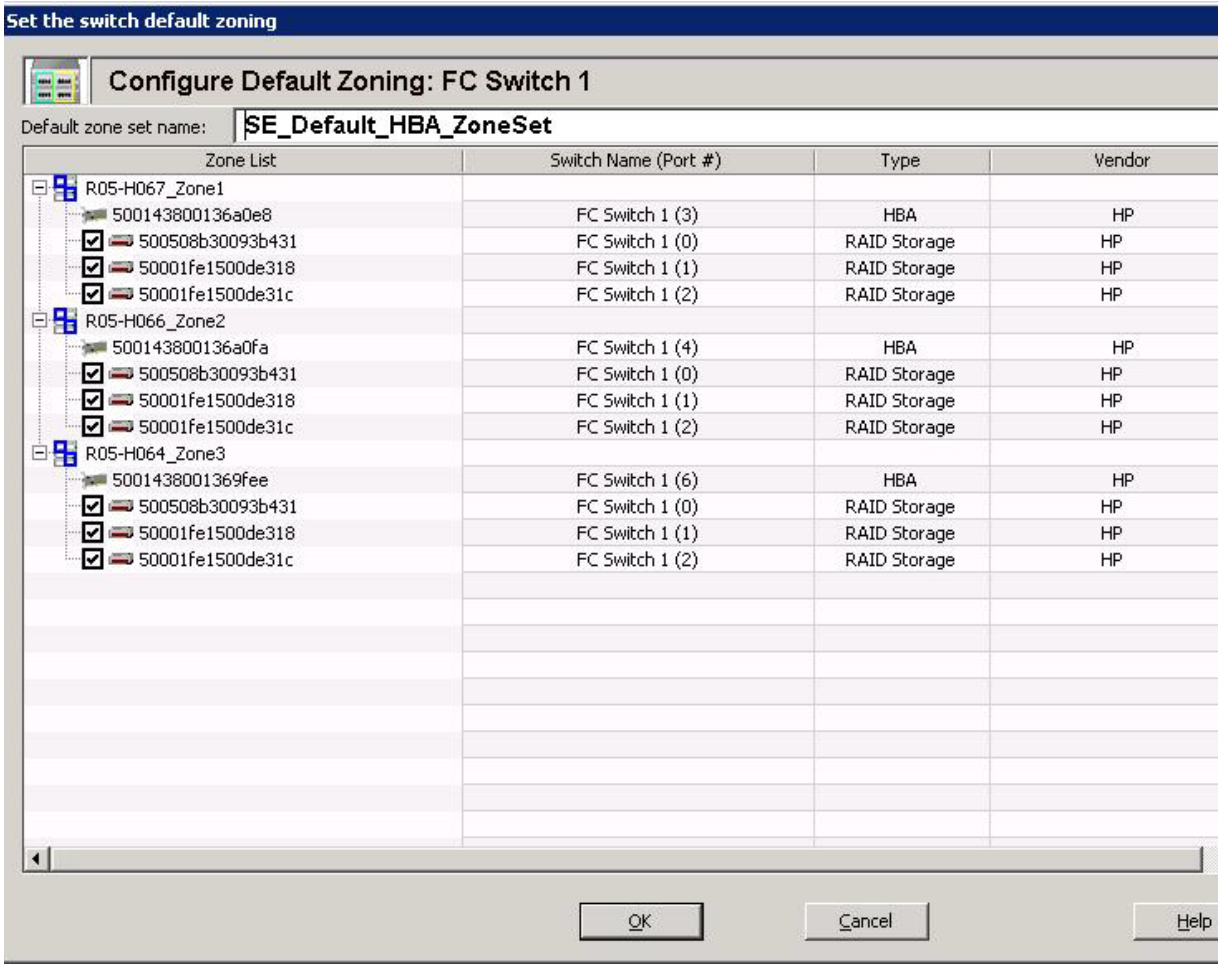

Figure 17 Set the Switch Default Zoning dialog box: new switch setup

The Set the Switch Default Zoning dialog box contains the following information:

- Default zone set name—Shows the default name for the current switch zoning configuration.
- Zone List—Shows the existing HBA zones with its HBA adapter and devices. If a zone list is closed (the Switch Port #, Type, and Vendor information is hidden), click the plus mark (+) to open it.
- Switch Name (Port #)—Indicates the switch name and port number for each HBA and device.
- Type—Indicates the kind of device; for example, HBA or RAID storage.
- Vendor—Indicates the seller for the hardware indicated.

11. Complete the Set the Switch Default Zoning dialog box as follows:
    a. In the Default zone set name box, enter a new name for your configuration.
    b. To exclude a storage port from the zone, clear the check box next to the port name. To include a storage port in the zone, select the check box next to it.
    c. To save the new switch default zoning setup, click **OK**. To stop the switch zoning changes, click **Cancel**.

    The New Switch Setup dialog box shows a check mark next to the third step, "Set switch administrator password," (Figure 18) indicating that you have completed that task.

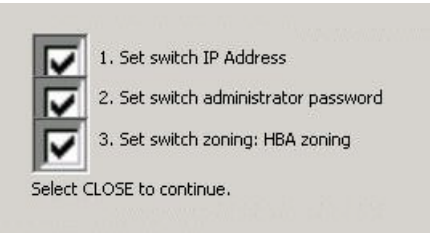

Figure 18 Third step of New Switch Setup completed

12. Click **Close** to close the New Switch Setup dialog box for this switch.
13. If SAN Connection Manager detects another unconfigured switch, the New Switch Setup wizard opens again for that switch and guides you through its setup.

    After you have either completed all the steps required in the New Switch Setup procedures (step 4 through step 9), or opted not to set up the switch at this time, the Welcome… Configure Your SAN dialog box (Figure 19) appears.

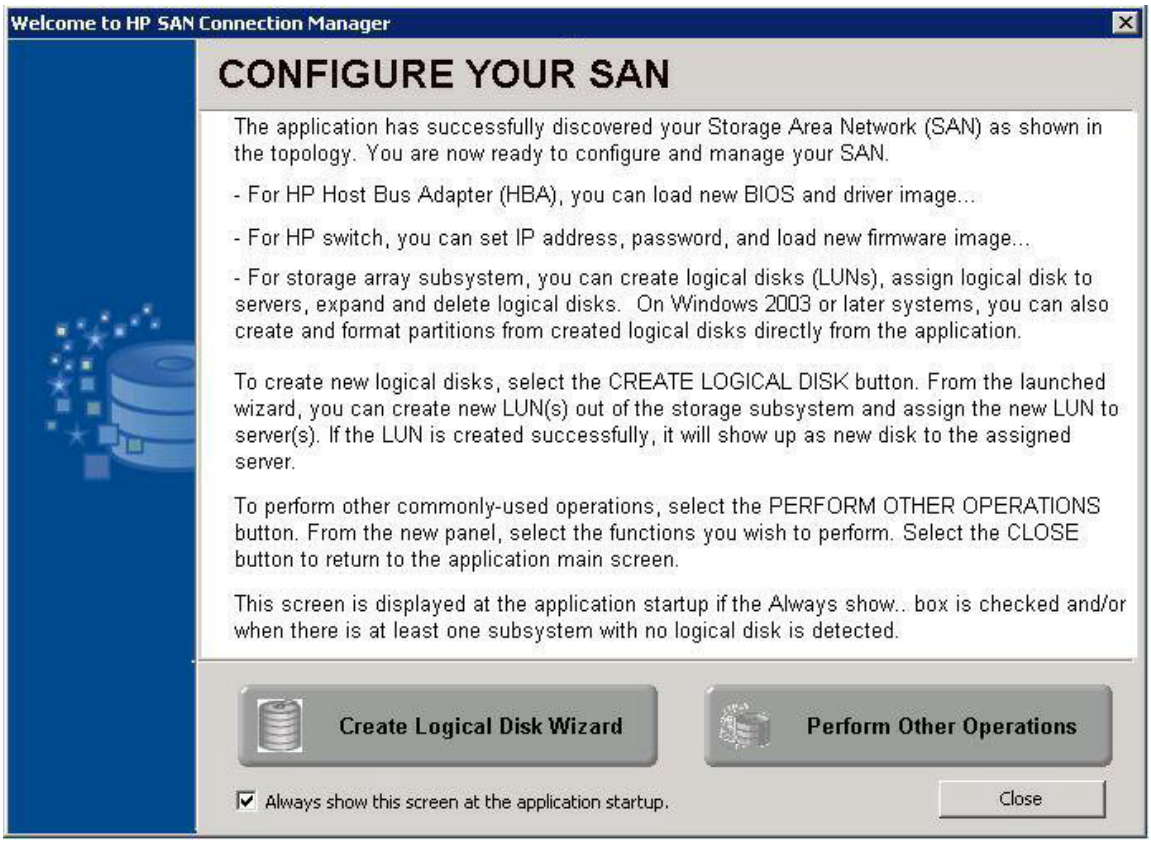

Figure 19 Welcome… Configure Your SAN dialog box

14. Select from the following SAN configuration options:
    - To prevent the Welcome dialog box from opening every time you start SAN Connection Manager, clear the **Always show this screen at the application startup** check box. (Be aware that if you clear this check box, you cannot later reinstate the Welcome dialog box.)
    - To exit this dialog box without performing any configuration, and view the SAN Connection Manager main window, click **Close**. (All configuration options offered on this dialog box are also available from the main window.)
    - To launch the Create New Logical Disk wizard and add a new logical disk to your SAN, click **Create Logical Disk Wizard**. For details, see either "Creating a logical disk—EVA storage," page 84 or "Creating a logical disk—MSA storage," page 88.
    - To open the Perform Other Operations dialog box (Figure 20) and select from additional configuration options, click **Perform Other Operations**.

Figure 20 Perform Other Operations dialog box

15. If you clicked **Perform Other Operations** on the Welcome... Configure Your SAN dialog box, select from these common SAN configuration operations:

    Logical Disk and Partition Operations:
    - Click **Assign Logical Disk to Server** to open the Logical Disk Server Presentation dialog box (see "Assigning and unassigning a logical disk to a server," page 95).
    - Click **Create & Manage Partitions** to open the Create & Manage Partitions dialog box (see "Creating and managing partitions," page 105).
    - Click **Expand Logical Disk Size** to open the Expand Logical Disk dialog box (see "Expanding a logical disk," page 97).
    - Click **Delete Logical Disk** to open the Delete Logical Disk dialog box (see "Deleting a logical disk," page 98).

Drive Operations:

- Click **Manage Hot Spare Drive** to set or remove a drive as a hot spare from the Manage Storage Subsystem dialog box (see "Managing storage subsystems," page 122).
- Click **Blink Drive LED** to flash a drive's LED from the Manage Storage Subsystem dialog box (see "Managing storage subsystems," page 122).

Switch Operations:

- Click **Set Switch IP Address** to open the Set Switch IP Address dialog box (see "Setting the switch IP address," page 54).
- Click **Update Switch Firmware** to open the Switch Firmware Update wizard (see "Updating switch firmware," page 56).

HBA Operations:

- Click **Update HBA BIOS** to open the Update HBA BIOS wizard (see "Updating an HBA BIOS image," page 76).
- Click **Update HBA Driver** to open the HBA Driver Update wizard (see "Updating an HBA driver," page 78).

16. To exit this dialog box without performing any configuration, and view the SAN Connection Manager main window, click **Close**. (All configuration options offered on this dialog box are also available from the main window.)
17. A dialog box indicates when the last refresh of the SAN components was performed. Click **OK**.

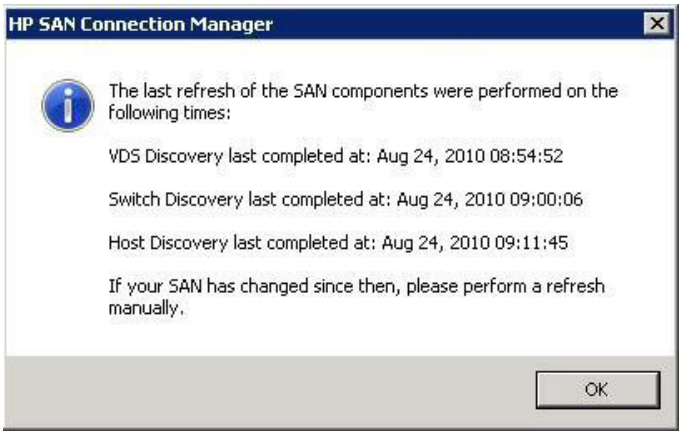

Figure 21 Last Refresh of SAN Components dialog box

Now that you have completed the initial switch setup and other common configuration operations, you can use SAN Connection Manager to configure your SAN, as described in the remainder of this guide.

4 Viewing Maps, Events, and Configurations

Viewing a Physical Connection map

SAN Connection Manager provides a graphical representation of physical connections among the storage subsystems, switches, and HBAs within the SAN. This graphical representation is the Physical Connection map shown in the content pane (Figure 22).

Description of a Physical Connection map

The Physical Connection map (Figure 22) uses blue lines to designate the physical connections between devices in the SAN.

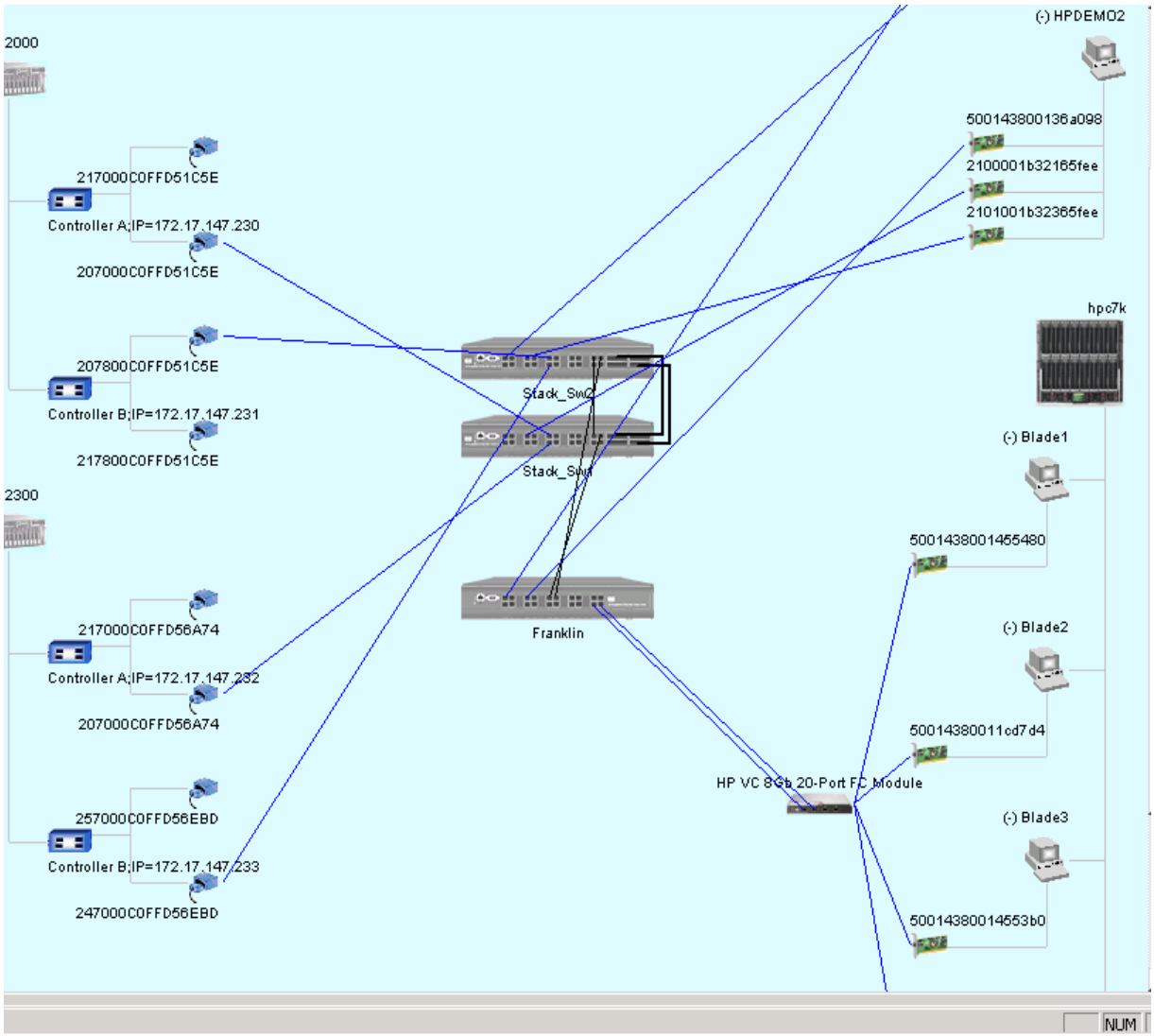

Figure 22 Physical Connection map

The map shows the following components:

- Switches:
  - A black line between switches indicates an ISL.
  - A grayed-out switch on the map indicates a remote fabric (Brocade or Cisco fabric that may contain multiple switches) connected by means of an active TR_Port.

- An orange line (or lines) from the SN6000 Fibre Channel Switch or 8/20q Fibre Channel Switch to a grayed-out switch indicates a connection between an active TR_Port and the remote fabric, but appears *only* if the switch has been configured with IFZs. For more information, see "About transparent routing," page 47.

- Servers
- HBAs
- Storage subsystems
- Storage subsystem controllers
- Storage subsystem controller's ports
- Blade servers
- Blade enclosures
- VC-FC Modules

NOTE: The information presented is read-only. You can right-click any of the icons representing switches, HBAs, servers, and subsystems to open a shortcut menu for that component.

How to view a Physical Connection map

To view a physical connection map:

1. In the navigation pane, click on the root of the navigation pane:
   - If the navigation pane displays the Storage Subsystem - Logical Disk View, the root is called Subsystem - Logical Disk.
   - If the navigation pane displays the Server - Storage View, the root is called Server - Logical Disk.
2. The content pane shows a topology map. If the map displayed is LUN Assignment map, click the **Physical Connection Map** tab to bring that map forward.

Viewing a LUN Assignment map

SAN Connection Manager provides a graphical representation for the access to logical disks from the HBAs and servers within the SAN. This graphical representation is the LUN Assignment map shown in the content pane (Figure 23).

Description of a LUN Assignment map

The LUN Assignment map (Figure 23) shows the access link between the HBAs and servers to the subsystems' logical disks. The blue lines indicate that the HBAs or servers are allowed to have access to the logical disk.

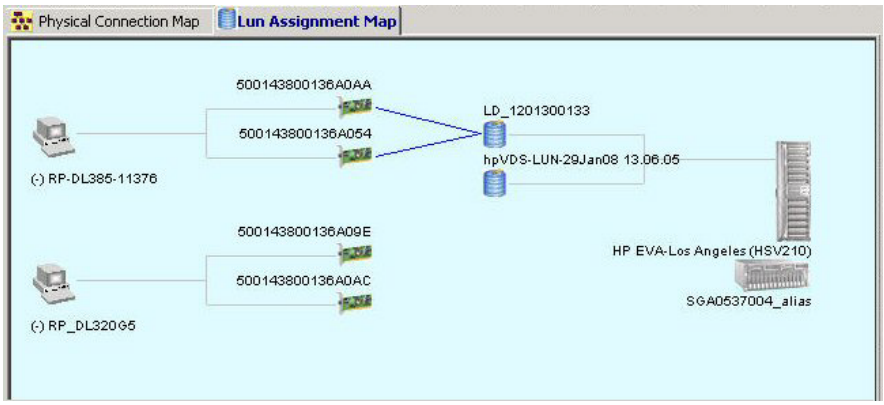

Figure 23 LUN Assignment map

The map shows the following components:

- Storage subsystems
- LUNs
- Servers (Click the server name or icon to show or hide the HBAs on the topology map.)
- HBAs

NOTE: The information presented is read-only. You can right-click any of the icons representing the subsystem, LUNs, HBAs, and servers to open the shortcut menu for that component.

How to view a LUN Assignment map

To view a LUN Assignment map:

1. In the navigation pane, click on the root of the navigation pane:
   - If the navigation pane displays the Storage Subsystem - Logical Disk View, the root is called Subsystem - Logical Disk.
   - If the navigation pane displays the Server - Storage View, the root is called Server - Logical Disk.
2. The content pane opens a topology map. If the map shown is Physical Connection map, click the **LUN Assignment Map** tab to bring that map forward.

Viewing the event log

The event log lists all SAN Connection Manager-initiated actions and the results for the host, HBAs, switches, and storage subsystems. The event log begins recording when SAN Connection Manager is running. Event log entries are formatted by type, time stamp, category, source, event ID, and description. The log holds a maximum of 1,999 entries. When the maximum is reached, the event list wraps, and the oldest events are discarded and replaced with the new events.

The Type column icon and text indicate an entry's severity:

Info indicates information only.
Warning indicates a minor warning condition.
Error indicates an error condition.

To view the event log:

- On the File menu, click **Event Log**.
  The Application Event Log dialog box (Figure 24) opens.

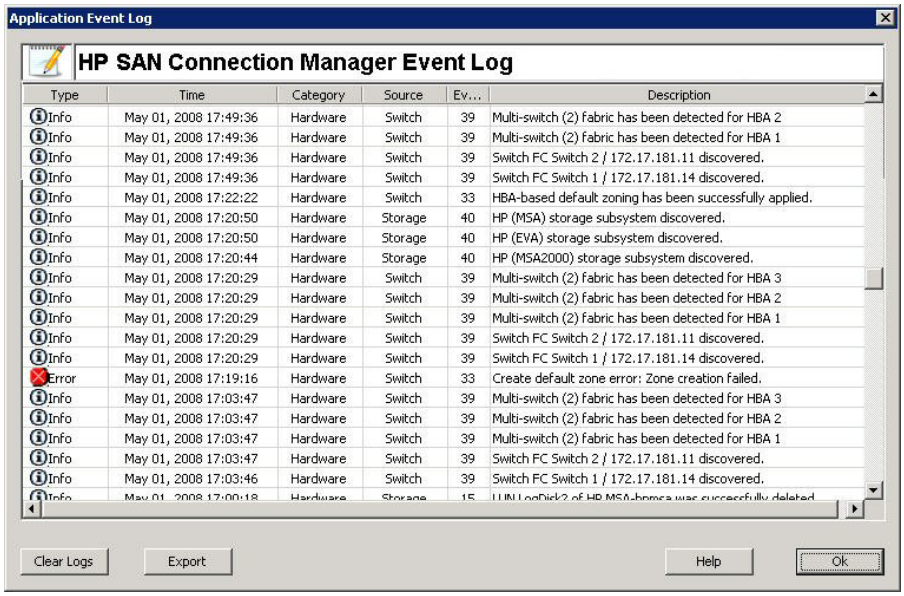

Figure 24 Application Event Log dialog box

To clear the entire event log:

- On the bottom of the Application Event Log dialog box, click the **Clear Logs** button. The event log is emptied and ready for more entries.

To clear specific entries:

1. Right-click a specific event log entry (to select multiple entries, click the entries while holding down the **CTRL** key).
2. On the shortcut menu, click **Delete Entry** to remove the selected entries from the event log.

To export the event log:

1. On the bottom of the Application Event Log dialog box, click the **Export** button to open the Export Event Log dialog box.
2. Navigate to the location where you want to save the event log, and then enter a name for the file with a `.TXT` extension.
3. Click **Save**.

Saving and comparing SAN configurations

You can save the current SAN connection configuration (see "Saving the current configuration," page 44), and compare that configuration with a previous configuration (see "Comparing configurations," page 45).

Saving the current configuration

SAN Connection Manager provides the ability to save a graphical topology of your current SAN that can be easily viewed to note any changes made to your system. You should save your SAN connections before making changes so that you can then see the differences (see "Comparing configurations," page 45).

To save a configuration:

- On the File menu, click **Save current SAN connection**.

NOTE: SAN Connection Manager automatically saves the current configuration when you close the application.

Comparing configurations

SAN Connection Manager provides the ability to compare any changes to your current SAN with the previous configuration.

To compare a configuration:

1. On the File menu, click **Compare current and previous SAN connection**.
   The Compare Current and Previous Configuration dialog box (Figure 25) opens.

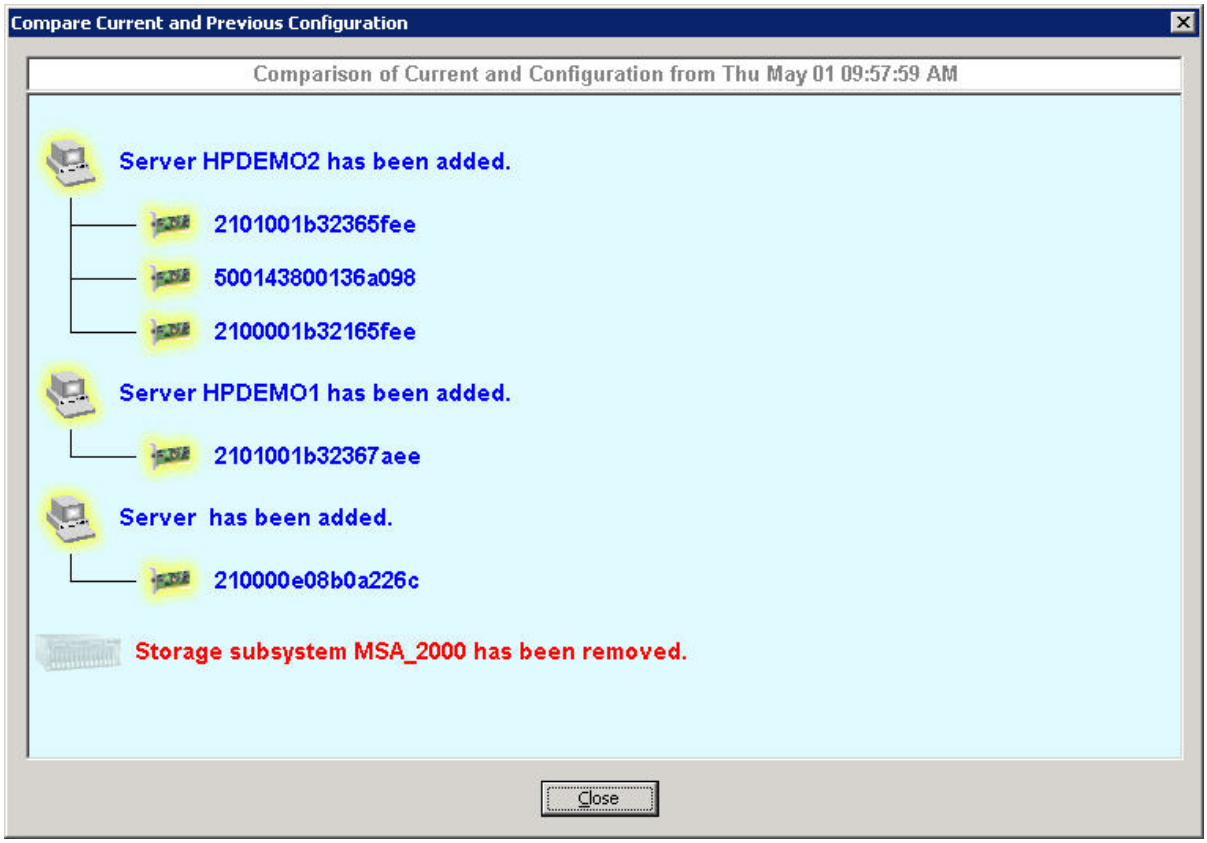

Figure 25 Compare Current and Previous Configuration dialog box

   This dialog box shows a graphical representation listing:

   - Removed servers
   - New servers
   - New HBAs
   - Removed switch(es)
   - New switch(es)
   - Removed storage subsystem(s)
   - New storage subsystem(s)

2. When you finish reviewing the dialog box, click **Close**.

5 Managing Switches

This chapter provides the procedures for using SAN Connection Manager to view and manage your SN6000 Fibre Channel Switch or 8/20q Fibre Channel Switch.

About transparent routing

The transparent routing feature provides inter-fabric routing to enable controlled and limited access between devices on an SN6000 Fibre Channel Switch or 8/20q Fibre Channel Switch (local) fabric and devices on a remote fabric consisting of switches made by other vendors. For a list of switches that are supported in a remote fabric, see the *HP SAN Design Reference Guide* located at the HP website: http://www.hp.com/go/sandesignguide. This type of inter-fabric connection uses the Fibre Channel industry N_Port ID Virtualization (NPIV), and makes local and remote devices accessible to each other while maintaining the local and remote fabrics as separate fabrics.

Transparent routing configuration consists of connecting the local fabric over one or more TR_Ports to the remote fabric, and then creating IFZs by which you map the local devices to the remote devices. To complete the configuration and make it active, you must activate the same IFZs on both the local fabric and the remote fabric.

SAN Connection Manager displays, on the Physical Connection map (see page 41), the remote fabric as an unavailable switch, which represents one or more HP B-series or C-series switches and their connected devices. However, SAN Connection Manager cannot be used to manage the remote fabric or to configure transparent routing. To configure transparent routing, use the SN6000 Fibre Channel Switch or 8/20q Fibre Channel Switch QuickTools web applet as described in the *HP 8/20q Fibre Channel Switch QuickTools Switch Management User Guide* or the *HP SN6000 Fibre Channel Switch QuickTools Switch Management User Guide*.

Viewing switch properties

SAN Connection Manager provides a quick and easy way to view properties related to switches within your SAN.

Description of the switch properties

The Switch Properties (Figure 26) include the following read-only information:

- Symbolic Name
- Model
- World-wide name
- Serial Number
- MAC Address
- Domain ID
- Firmware Version
- Operational State

Figure 26 Switch Properties

How to view switch properties

To view switch properties:

1. To access the switch properties, choose one of the following options:
   - On the Adapter & Switch Management menu, click **Get Switch Properties**. If there is only one switch in your SAN, it's properties appear. If there is more than one switch, the Switch Selection dialog box opens; continue with step 2.
   - On the content pane's Physical Connection map, right-click the switch icon, and on the shortcut menu, click **Get Switch Properties**.
2. If the Switch Selection dialog box opens, select the switch you want to view.
3. When you finish viewing the switch properties, click **OK** to close the dialog box.

Viewing network properties

SAN Connection Manager provides a quick and easy way to view properties related to your storage area network.

Description of the network properties

The Network Properties (Figure 27) include the following read-only information:

- IPv4 network settings: Enabled, Address, Subnet Mask, and Gateway
- IPv6 network settings: Enabled, Address, Gateway, and Assigned Addresses
- SNMP Enabled
- Broadcast Support Enabled
- DNS Enabled
- Configured Local Hostname (if any)
- Assigned Local Hostname (if any)

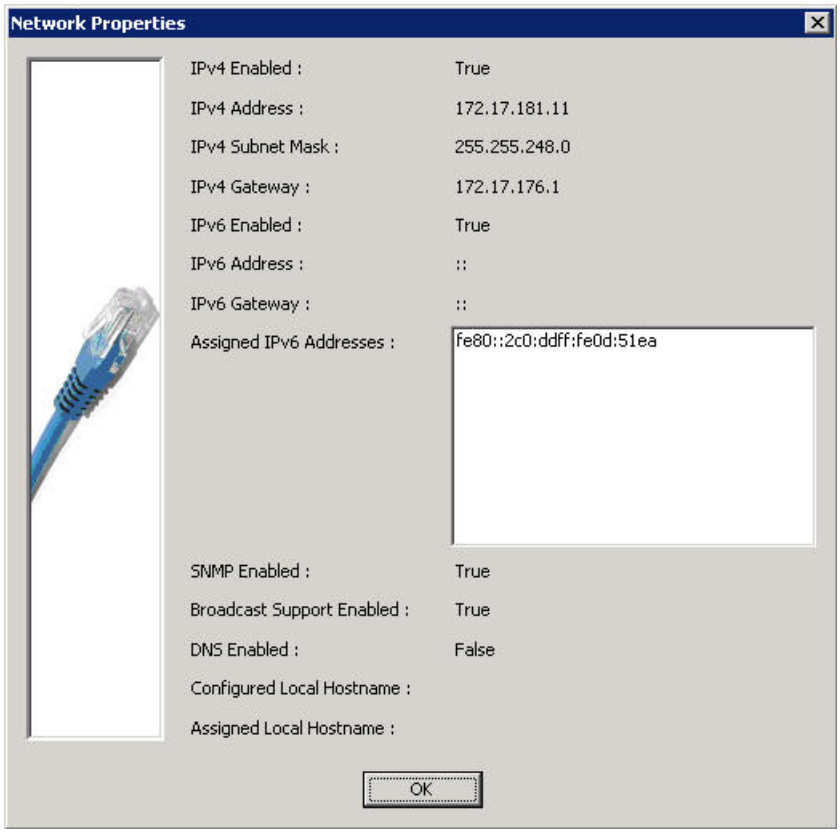

Figure 27 Network Properties

How to view network properties

To view network properties:

1. To access the switch properties, choose one of the following options:
   - On the Adapter & Switch Management menu, click **Get Network Properties**. If there is only one switch, the switch is automatically selected; continue with step 3. If there is more than one switch, the Switch Selection dialog box opens; continue with step 2.
   - On the content pane's Physical Connection map, right-click the switch icon, and on the shortcut menu, click **Get Network Properties**.
2. If the Switch Selection dialog box opens, select the switch you want to view.
3. When you finish viewing the network properties, click **OK** to close the dialog box.

Viewing switch zoning information

The Switch Zoning Information dialog box provides facts about the current switch zoning setup. This information is read-only; you cannot make changes on this dialog box. To change switch zoning, see "Setting the switch default zoning," page 51.

To view switch zoning information:

1. On the Adapter & Switch Management menu, click **Get Switch Zoning Information**.
   The Switch Zoning Information dialog box (Figure 28) opens.

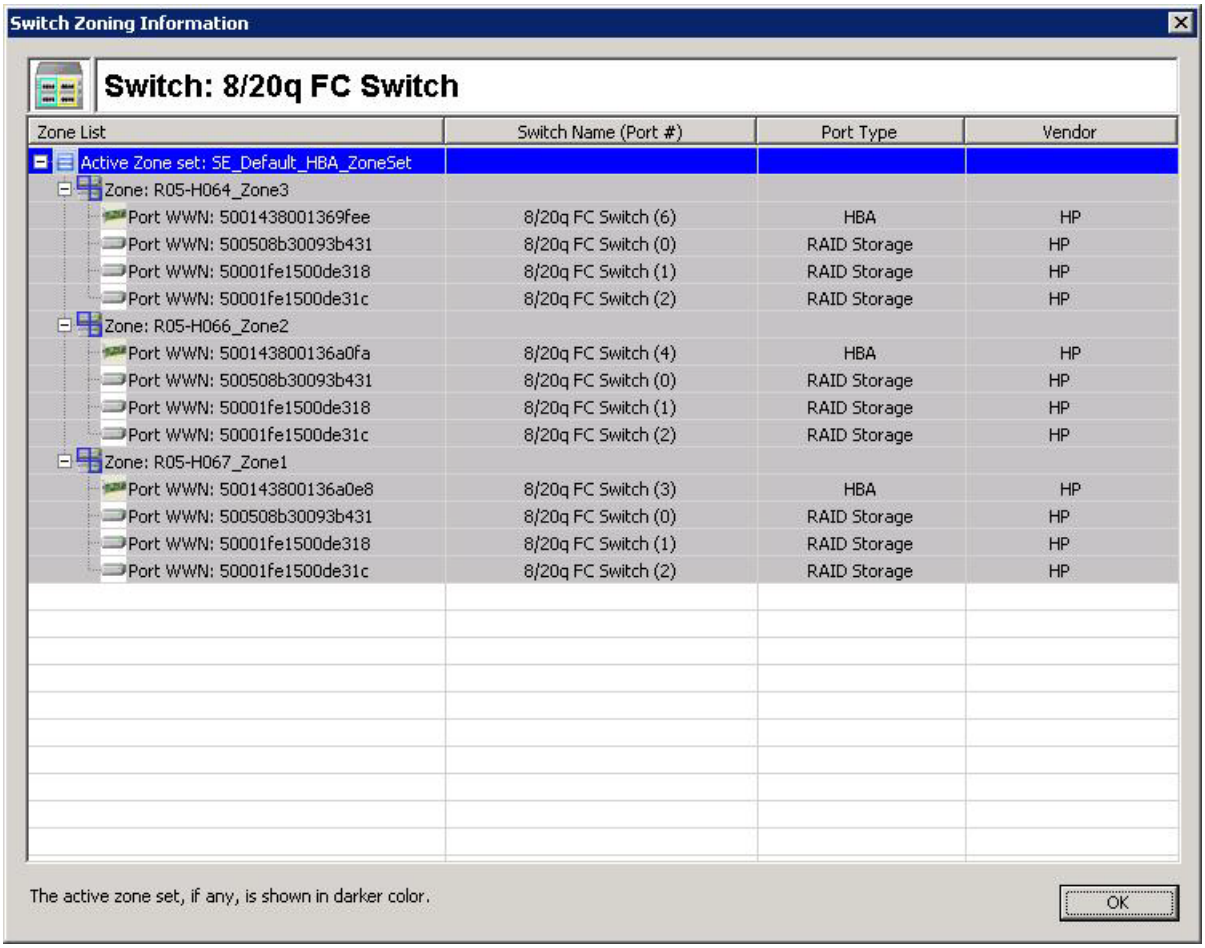

Figure 28 Switch Zoning Information dialog box

This dialog box shows the following current information about your switch:

- Zone List—Lists all zones and the members of each. The currently active zones are shown in a darker color.
- Switch Name (Port #)—Shows the switch name and, in parentheses, the number of the switch port that is attached to the HBA or RAID storage device.
- Port Type—Shows the type of port; for example, HBA or RAID storage.
- Vendor—Attached device manufacturer name; for example, Hewlett Packard.

2. When you finish viewing the switch zoning information, click **OK** to close the dialog box.

NOTE: If you have transparent routing configured with IFZs activated (see "About transparent routing," page 47), the switch zoning information may appear in SAN Connection Manager (Figure 29). IFZs appear as `ZONE: IFZ_xxxxxxxxxxxxxxx_xxxxxxxxxxxxxxx`, followed by the Port WWN of each TR_Port, host port, and storage port. If known, the Switch Name, Port Type, and Vendor information are shown; otherwise, this information is displayed as "Unknown."

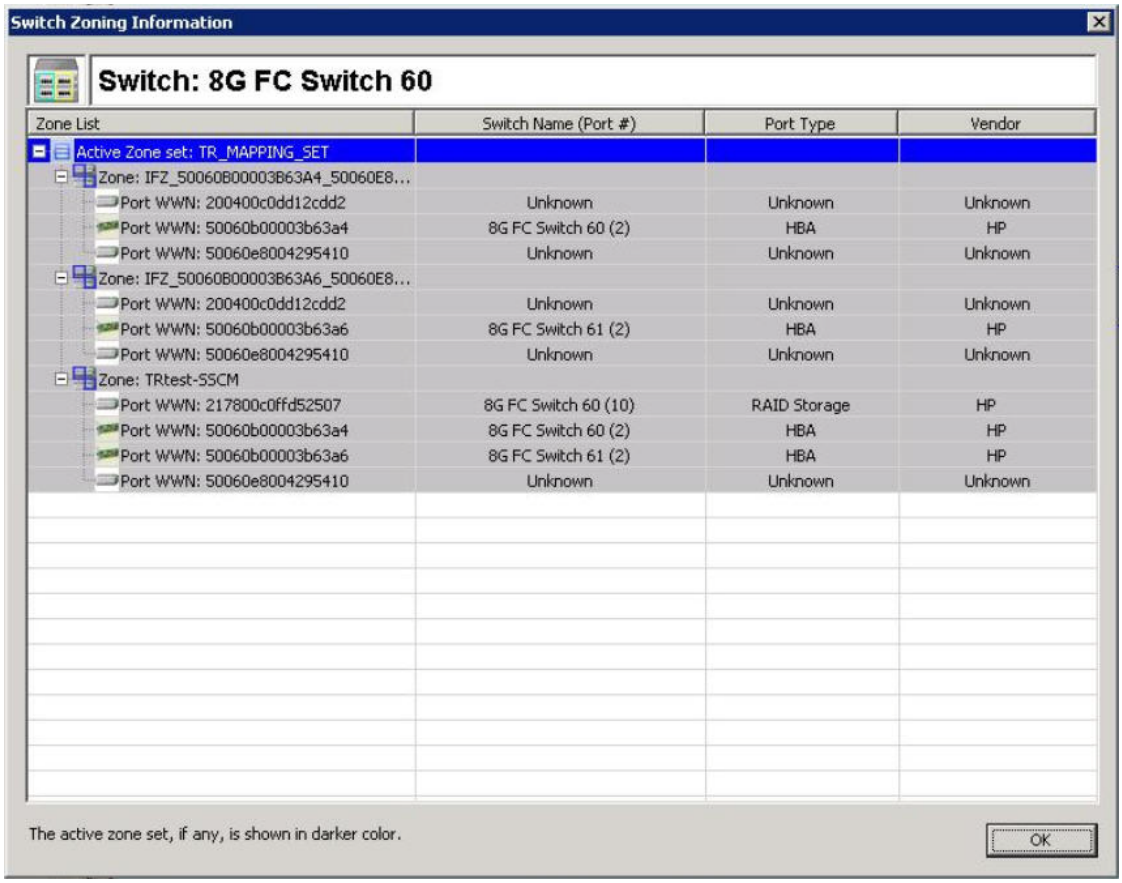

Figure 29 Switch Zoning Information dialog box (TR_Ports mapping)

Setting the switch default zoning

CAUTION: Altering the active zoning configuration can disrupt SAN traffic.

A *zone* is a named group of ports or devices. Members of the same zone can communicate with each other and transmit outside the zone, but cannot receive inbound traffic from outside the zone. Zoning divides the fabric for purposes of controlling discovery and inbound traffic.

Based on the HBA and storage ports connected to the switch, SAN Connection Manager can set the switch zoning to an HBA-based zoning scheme where each HBA is in its own zone along with all the storage ports.

Use the Set the Switch Default Zoning dialog box to set a default zone and include or exclude a device from a zone.

NOTE: When the Set the Switch Default Zoning dialog box first opens, all the devices are included in zones.

To set the switch default zoning:

1. From the Adapter & Switch Management menu, click **Set Switch HBA-based Default Zoning**.
   If the switch already has an active zoning setup, a message box asks if you want to remove and replace existing zoning with the default HBA-based zoning and advises you to carefully review the current active zoning. Be aware that modifying zoning can disrupt SAN traffic.
2. To close the message box and continue, click **Yes**. To cancel switch default zoning setup, click **No**.
   The Set the Switch Default Zoning dialog box (Figure 30) opens.

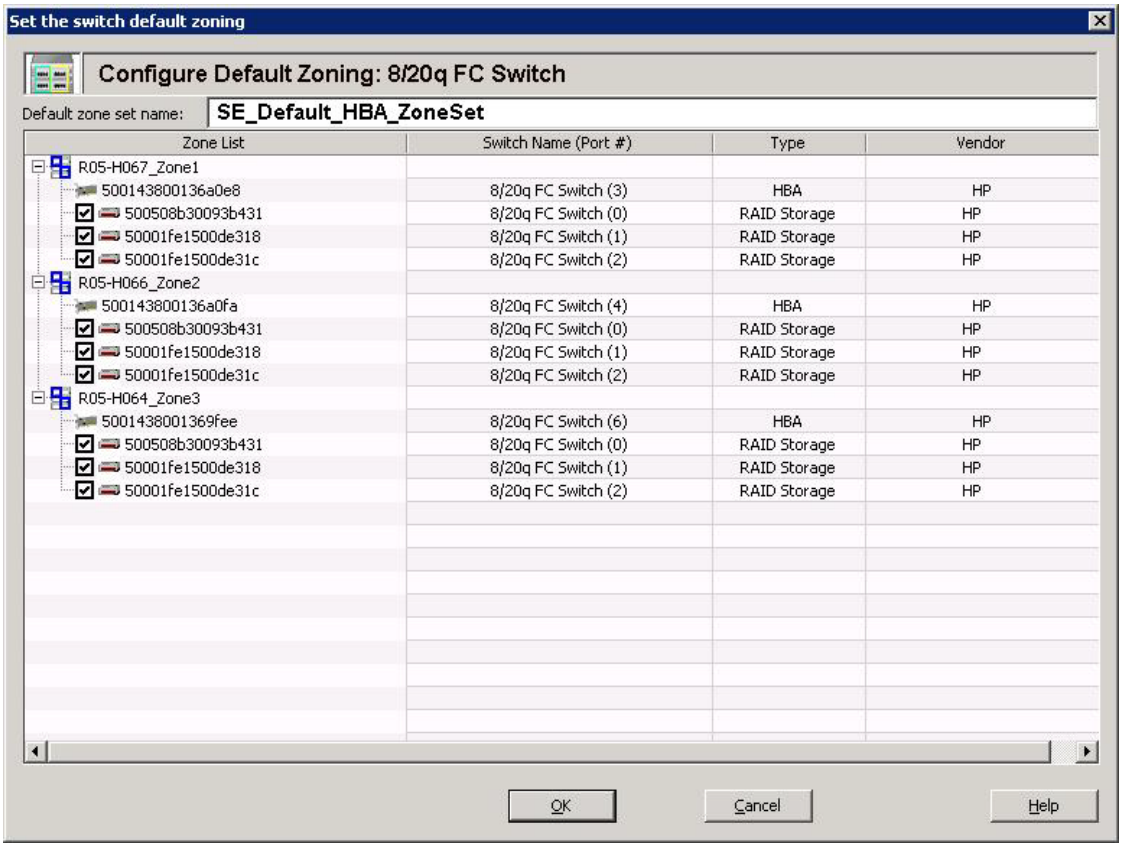

Figure 30 Set the Switch Default Zoning dialog box

This dialog box contains the following information:

- Zone List—Shows the existing HBA zones with its HBA adapter and devices. If a zone list is closed (the Switch Name, Port #, Type, and Vendor information is hidden), click the plus mark (+) to open it.
- Switch Name (Port #)—Shows the switch name and, in parentheses, the number of the switch port that is attached to the HBA or RAID storage device.
- Type—Indicates the kind of device, for instance HBA or RAID storage.
- Vendor—Attached device manufacturer name; for example HP.

3. In the Default zone set name box, enter a name for the new default zone set.
4. To exclude a storage port from the new zone set, clear the check box next to the port name. To include a storage port in the new zone set, select the check box next to it.
5. To save the new switch default zoning setup, click **OK**. To abandon the switch zoning changes, click **Cancel**.

NOTE: To use other zoning schemes, use the QuickTools switch management web applet to set the zoning. To start the switch QuickTools web applet, click the **Physical Connection Map** tab, right-click the switch icon, and then on the shortcut menu, click **Launch the switch QuickTool application**.

Setting the switch admin password

SAN Connection Manager provides a quick and easy way to set switch administrator passwords within your SAN. These passwords are required for all update operations to be performed on the switch, including:

- Updating firmware
- Setting switch symbolic name
- Setting domain ID

Setting switch admin passwords prevents unauthorized users from performing these operations.

To set a switch admin password:

1. To access the Set Switch Admin Password dialog box, choose one of the following options:
   - On the Adapter & Switch Management menu, click **Set Switch Admin Password**.
   - In the content pane's Physical Connection map, right-click the switch icon to select a specific switch, and then on the shortcut menu, click **Set Switch Admin Password**.

   The Set Switch Admin Password dialog box (Figure 31) opens.

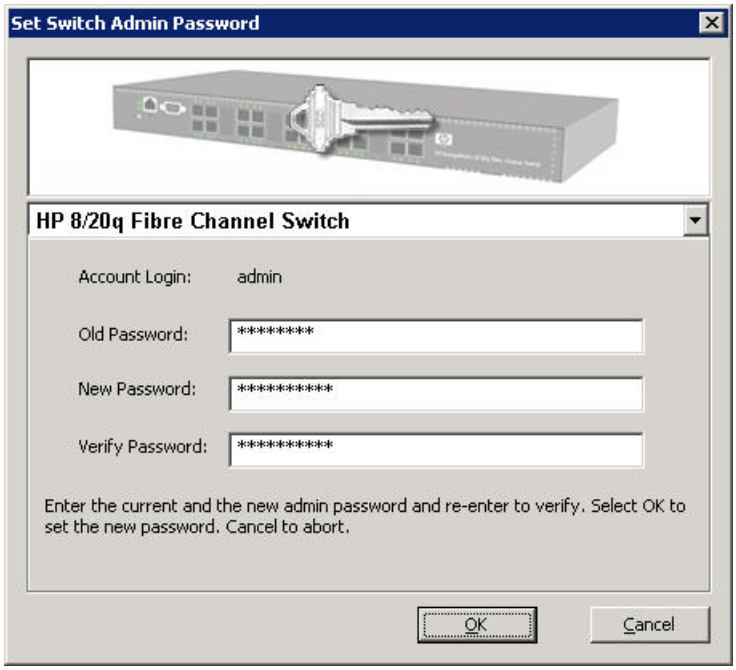

Figure 31 Set Switch Admin Password dialog box

2. If no specific switch is selected, select the switch you want from the drop-down list at the top of the dialog box. If a specific switch has been selected, the drop-down list is disabled.
3. In the Old Password box, enter the current admin login password. (The default Old Password is `password`.)
4. In the New Password box, enter a new admin login password.
5. In the Verify Password box, re-enter the new password.
6. To change the password, click **OK**. To abandon the password change, click **Cancel**.

Setting the switch IP address

SAN Connection Manager provides a quick and easy way to set switch IP addresses within your SAN. This IP address allows the switch to be managed through the Ethernet link. Updating the switch's firmware, for example, requires the switch to have a valid IP address that the SAN Connection Manager server can use to communicate to the switch over the IP network. SAN Connection Manager supports both IPv4 and IPv6 addresses.

NOTE: If the protocol stack on the switch is currently disabled, setting the switch IP address will enable the stack.

To set a switch IP address:

1. To access the Set Switch IP Address dialog box, choose one of the following options:
   - On the Adapter & Switch Management menu, click **Set Switch IP Address**.
   - In the content pane's Physical Connection map, right-click a switch icon to select that specific switch, and then on the shortcut menu, click **Set Switch IP Address**.
2. If no specific switch is selected and if there is more than one switch in the SAN, the Switch Selection dialog box opens. Select the switch you want to change, and then click **OK**.

   The Set Switch IP Address dialog box (Figure 32) opens.

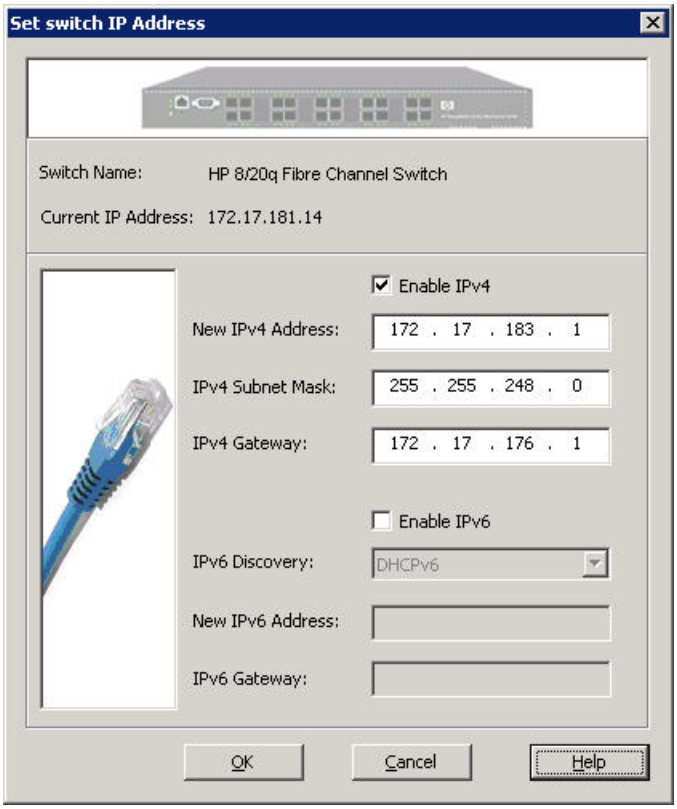

Figure 32 Set Switch IP Address dialog box

The dialog box shows the switch name and its current IP address on the top portion, and enables you to set either an IPv4 or IPv6 address for the switch on the bottom portion.

3. To set an IPv4 address for the switch, select the **Enable IPv4** check box, and then enter a valid IPv4 address, subnet mask, and gateway in the appropriate boxes.

4. To set an IPv6 address for the switch, select the **Enable IPv6** check box, and then complete the following for IPv6:
   a. From the IPv6 Discovery list, select one of the following:
      - **Static**—Select this option to enable the IPv6 address and gateway boxes and define those values.
      - **DHCPv6**—Select this option to use Dynamic Host Configuration Protocol for IPv6. DHCPv6 can be used to statefully assign addresses if the network administrator needs more control over addressing. It can also be used to distribute information that is not otherwise discoverable; for example, the DNS server. (If you select **DHCPv6**, the IPv6 address and gateway boxes become unavailable.)
      - **NDP**—Select this option to use Neighbor Discovery Protocol for IPv6, as part of the Stateless Address Autoconfiguration protocol. (If you select **NDP**, the IPv6 address and gateway boxes become unavailable.)
   b. If you selected **Static** for IPv6 Discovery, enter a valid address in the IPv6 Address box.

   NOTE: Ensure that you append a forward slash (/) and address mask length at the end of the IPv6 address. Valid mask lengths range from 0 through 128. In the following example, the combination of alphanumeric characters and colons (:) before the slash specify the IPv6 address and 96 specifies the mask length:

   fd70:c154:c2df:116:20b:cdff:feca:2942/96

   c. If you selected **Static** for IPv6 Discovery, enter a valid gateway in the IPv6 Gateway box.
5. To save your changes to the switch IP address and close this dialog box, click **OK**. To close this dialog box without making changes, click **Cancel**.

Updating switch firmware

SAN Connection Manager provides an easy way to update firmware for switches in your SAN.

To update switch firmware:

1. To access the Switch Firmware Update wizard, choose one of the following options:
   - On the Adapter & Switch Management menu, click **Update Switch Firmware**.
   - In the content pane's Physical Connection map, right-click a specific switch icon, and then on the shortcut menu, click **Update Switch Firmware**.

   The Switch Firmware Update wizard opens.
2. If a specific switch is selected, click **Next** and skip to step 4. If no specific switch is selected, the wizard (Figure 33) prompts you to select one or more switches; continue with step 3.

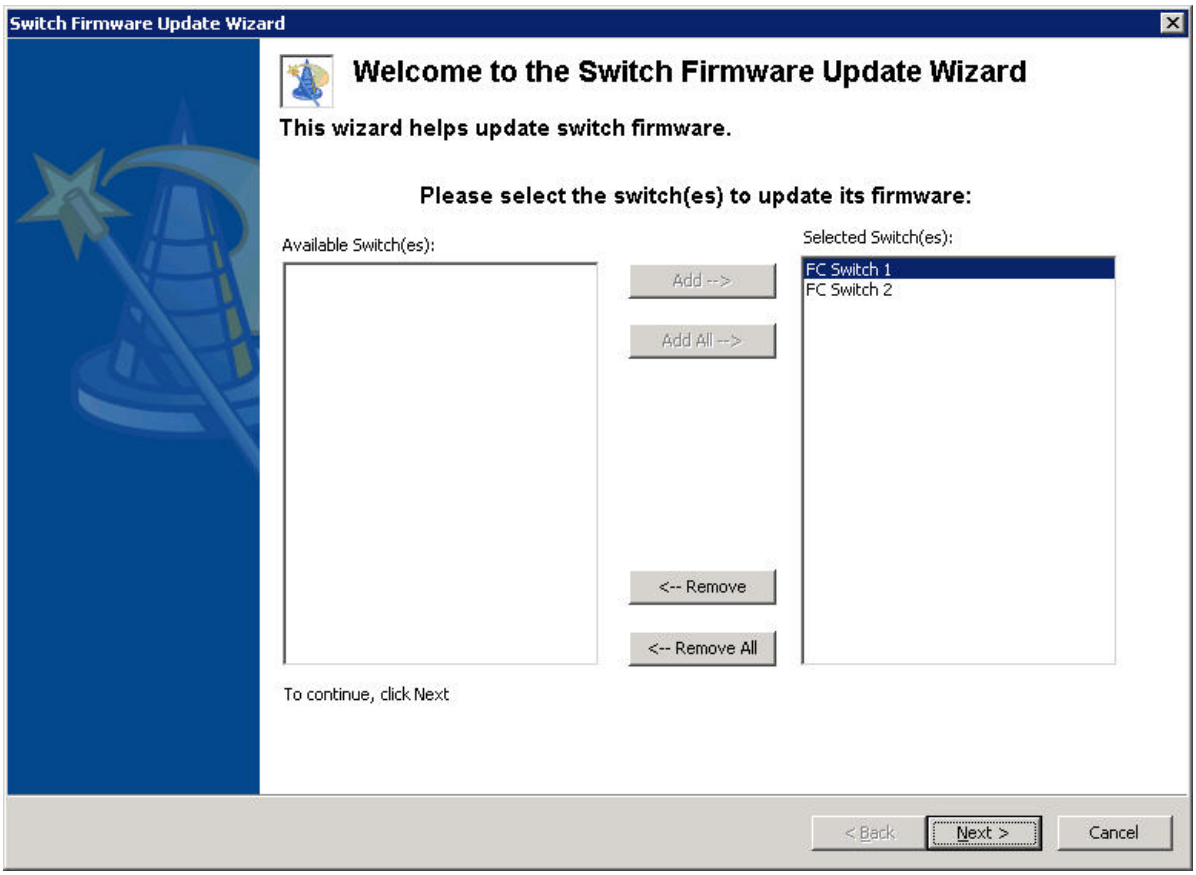

Figure 33 Switch Firmware Update Wizard: selecting a switch

3. In the Switch Firmware Update wizard's Available Switch(es) list, select one or more switches for which you want to update the firmware as follows:
   a. Choose one of the following options:
      - Select a switch on the Available Switch(es) list, and then click **Add**.
      - To select all of the available switches, click **Add All**.

   b. Click **Next**. (Next is disabled until you select at least one switch and add it to the Selected Switch(es) list.)

NOTE: If you select and add a switch by mistake, select that switch on the Selected Switch(es) list, and then click **Remove**. To clear the Selected Switch(es) list and start the selection again, click **Remove All.**

The wizard window lists switches selected for firmware update. The list provides the following information:

- Switch name.
- Current switch firmware version.
- Firmware image file name (this field is blank until you click and complete Select Switch Firmware File—see step 4).
- Switch administrator password for authentication (this field is blank until you click and complete Switch Admin Password—see step 6).
- Option to apply the new firmware image right after the update or wait until the next time the switch is turned off, and then back on. (This field is blank until you click and complete Switch Admin Password—see step 6).

NOTE: If the switch name and current firmware version shown are not correct, try to get the switch properties first. For details, see "Viewing switch properties," page 47.

4. Click **Select Switch Firmware File**.
5. Navigate to the folder containing the required file for the switch, select the firmware file, and then click **Open**.

   The Updated FW Image File column shows the file name.
6. Click **Switch Admin Password**.

   The Switch User Name and Password for Firmware Update dialog box (Figure 34) opens.

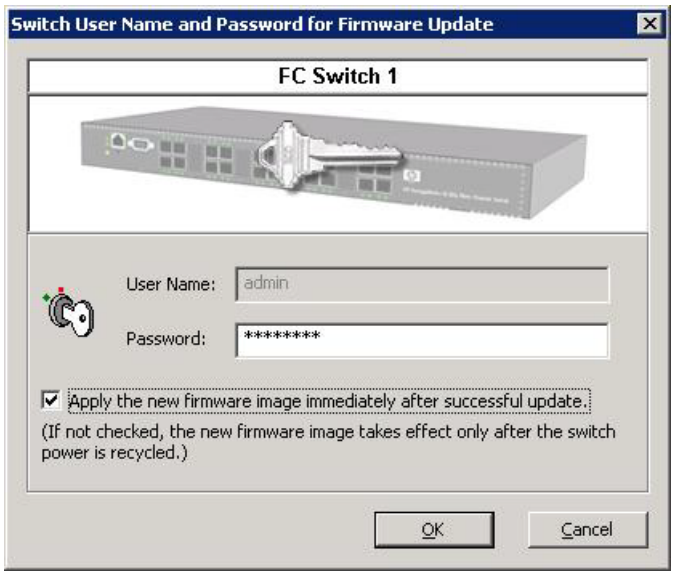

Figure 34 Switch User Name and Password for Firmware Update dialog box

7. In this dialog box, complete these steps:
   a. Enter the user name and password.
   b. (Optional) If you want the firmware update to take affect immediately, rather than after the switch power is recycled, select the **Apply the new firmware image immediately after successful update** check box.
   c. Click **OK**.
8. Repeat steps 4 through 7 for each switch you want to update, and then continue with step 9.

9. On the completed Switch Firmware Update wizard window (Figure 35), click **Next**.

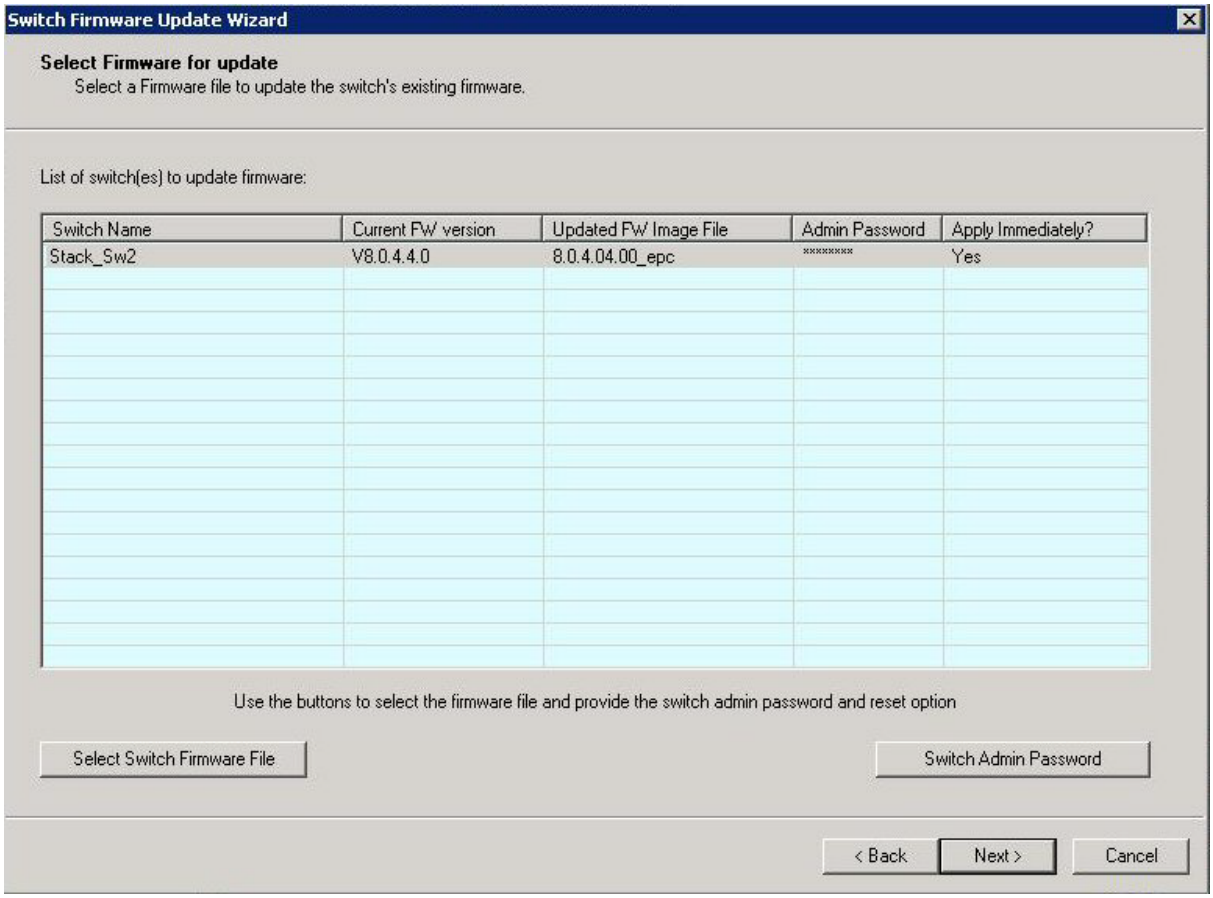

Figure 35 Switch Firmware Update wizard

10. To complete the wizard, choose one of the following options:
    - To confirm and proceed with the firmware update, click **Finish**.
    - To change your selections for the firmware update, click **Back**.
    - To stop the firmware update, click **Cancel**.

    If you clicked **Finish**, a message may inform you that the switch firmware is ready to be updated. The process takes several minutes per switch and cannot be canceled. Also, switch traffic may be temporarily disrupted.
11. Click **Yes** when prompted to update the switch firmware.

Setting switch SNMP properties

Use the SNMP Properties dialog box to define how authentication traps are managed and set for the switch. SNMP is the protocol that governs network management and monitoring of network devices. SNMP security consists of a read community string and a write community string, which are basically the passwords that control read and write access to the switch.

△ **CAUTION:** The read community string *public* and write community string *private* are set at the factory to these well-known defaults and should be changed if SNMP is enabled. If SNMP is enabled (default) and the read and write community strings have not been changed from their defaults, you risk unwanted access to the switch. It is very important that you consider how you want to manage the fabric and what switches you do not want managed through another switch.

To set the switch SNMP properties:

1. To access the SNMP Properties, choose one of the following options:
   - On the Adapter & Switch Management menu, click **Set Switch SNMP Properties**. (If you have more than one switch in your SAN, the Switch Selection dialog box prompts you to select a switch, and then click **OK**.)
   - In the content pane's Physical Connection map, right-click a specific switch icon, and then on the shortcut menu, click **Set Switch SNMP Properties**.

   The SNMP Properties dialog box (Figure 36) opens.

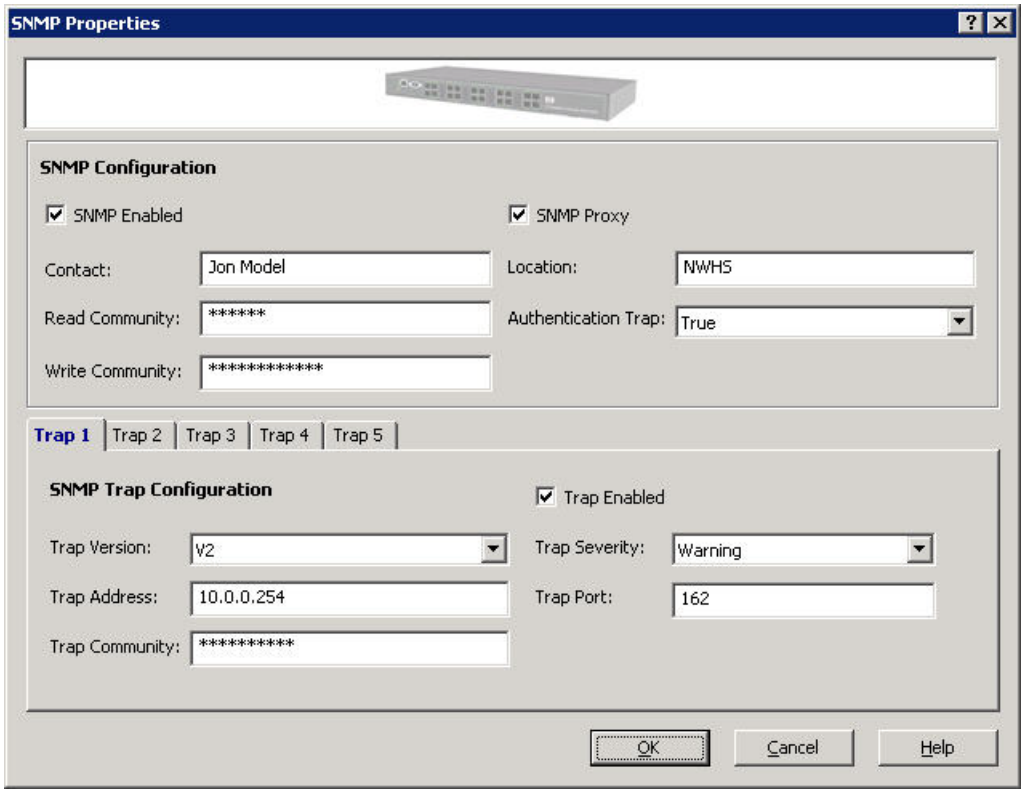

Figure 36 SNMP Properties

NOTE: Because Read Community, Write Community, and Trap Community settings are like passwords, they are write-only fields and the current settings are not shown.

Illegal characters are the pound sign (#), semi-colon (;), and comma (,).

2. In the top section, SNMP Configuration, define how authentication traps are managed by completing the following settings.

SNMP Enabled	Select this check box to allow SNMP communication with other switches in the fabric. Clear this check box to prevent an SNMP application at a workstation to talk to this switch.
Contact	Enter the name (maximum 64 characters) of the contact person who responds to trap events. The default is *sysContact undefined*.
Read Community	Enter the Read Community password (maximum 32 characters) that authorizes an SNMP agent to read information from the switch. This is a write-only field. The value on the switch and the SNMP management server must be the same. The default is *public*.
Write Community	Enter the Write Community password (maximum 32 characters) that authorizes an SNMP agent to write information to the switch. This is a write-only field. This value on the switch and the SNMP management server must be the same. The default is *private*.

SNMP Proxy	Select this check box to allow the use of SNMP to monitor and configure any switch in the fabric. Clear this check box to prevent this function.
Location	Enter a name (maximum 64 characters) for the switch location.
Authentication Trap	Allows reporting of SNMP authentication failures. In the event of an authentication failure caused by incorrect community string values, a notification trap is sent to the configured trap addresses. Click **True** to enable this feature, or click **False** to disable this feature. The default value is False.

The lower portion of the SNMP Properties dialog box contains tabs for each SNMP Trap Configuration, which define how each of the five traps are set.

3. For Trap 1, complete the following configuration settings:

Trap Enabled	Select this check box to enable this trap. Clear this check box to disable this trap (traps are not sent to trap monitoring stations and you cannot configure a disabled trap).
Trap Version	Select the SNMP version (V1 or V2) with which to format the traps.
Trap Address (see note below)	Enter the IPv4 or IPv6 address, or DNS host name, to which SNMP traps are sent. A maximum of five trap addresses are allowed, if the firmware on the switch supports the trap community string per trap enhancement. The default address for Trap 1 is 10.0.0.254. The default address for Traps 2 through 5 is 0.0.0.0.
Trap Community	Enter the Trap Community password that authorizes an SNMP agent to receive traps. This is a write-only field. The value on the switch and the SNMP management server must be the same. The default is *public*. You may enter up to 32 characters. Note that for switches running 7.4 or newer firmware, the Trap Community string is now per-trap. With firmware older than 7.4, there is just one Trap Community string for all SNMP configuration.
Trap Severity	Select a severity level to assign to the trap. Trap severity levels include Unknown, Emergency, Alert, Critical, Error, Warning, Notify, Info, Debug, and Mark.
Trap Port (see note below)	Enter the number (1–65535) of the port on which a trap is set.

NOTE: The Trap Address (other than 0.0.0.0) and Trap Port combination must be unique. For example, if Trap 1 and Trap 2 have the same address, they must have different port values. Similarly, if Trap 1 and Trap 2 have the same port value, they must have different addresses. However, you can have multiple trap destinations with the same address, if you ensure that the port values are different. You can accomplish this via clish (**c**ommand **l**ine **i**nterface **sh**ell) using a two-step process. First, set the address to something unique, modify the port, and save/activate. Second, go back in and set the address to one that is already set as a different trap destination.

4. To set additional traps, click the **Trap 2** through **Trap 5** tabs to bring each of those tabbed pages to the front and complete the settings on those pages (for details, refer to step 3).
5. To save the switch SNMP configuration settings and close this dialog box, click **OK**. To close the dialog box without making any changes, click **Cancel**.

Setting the switch symbolic name and domain ID

Use the Set Switch Symbolic Name and/or Domain ID dialog box to change the symbolic switch name or the domain ID.

To change the switch symbolic name and domain ID:

1. To access the Set Switch Symbolic Name and/or Domain ID dialog box, choose one of the following options:
   - On the Adapter & Switch Management menu, click **Set Switch Symbolic Name and/or Domain ID**. (If you have more than one switch in your SAN, the Switch Selection dialog box prompts you to select a switch, and then click **OK**.)
   - In the content pane's Physical Connection map, right-click a switch icon to select that specific switch. Then on the shortcut menu, click **Set Switch Symbolic Name and/or Domain ID**.

   The Set Switch Symbolic Name and/or Domain ID dialog box (Figure 37) opens and shows the current symbolic name and domain ID.

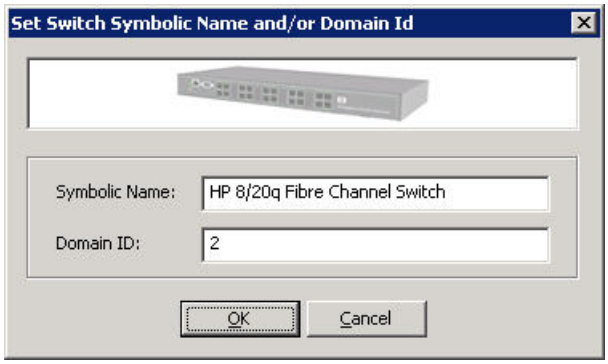

Figure 37 Set Switch Name and/or Domain ID dialog box

2. If you want to change the symbolic name, enter a new name (maximum 32 characters) in the Symbolic Name box.
3. If you want to change the domain ID, enter a new name in the Domain ID box.
4. To make the changes and close the dialog box, click **OK**. To close the dialog box without making any changes, click **Cancel**.

Setting DNS properties

SAN Connection Manager enables you to set the DNS on the switch. DNS is a system that stores all the information associated with domain names in a database. DNS is used to attach easy-to-remember domain names to hard-to-remember IP addresses in the form of URLs and e-mail addresses.

To set the switch DNS properties:

1. To access the DNS Properties dialog box, choose one of the following options:
   - On the Adapter & Switch Management menu, click **Set DNS Properties**. (If you have more than one switch in your SAN, the Switch Selection dialog box prompts you to select a switch, and then click **OK**.)
   - In the content pane's Physical Connection map, right-click a switch icon to select that specific switch. Then on the shortcut menu, click **Set DNS Properties**.

   The DNS Properties dialog box (Figure 38) opens.

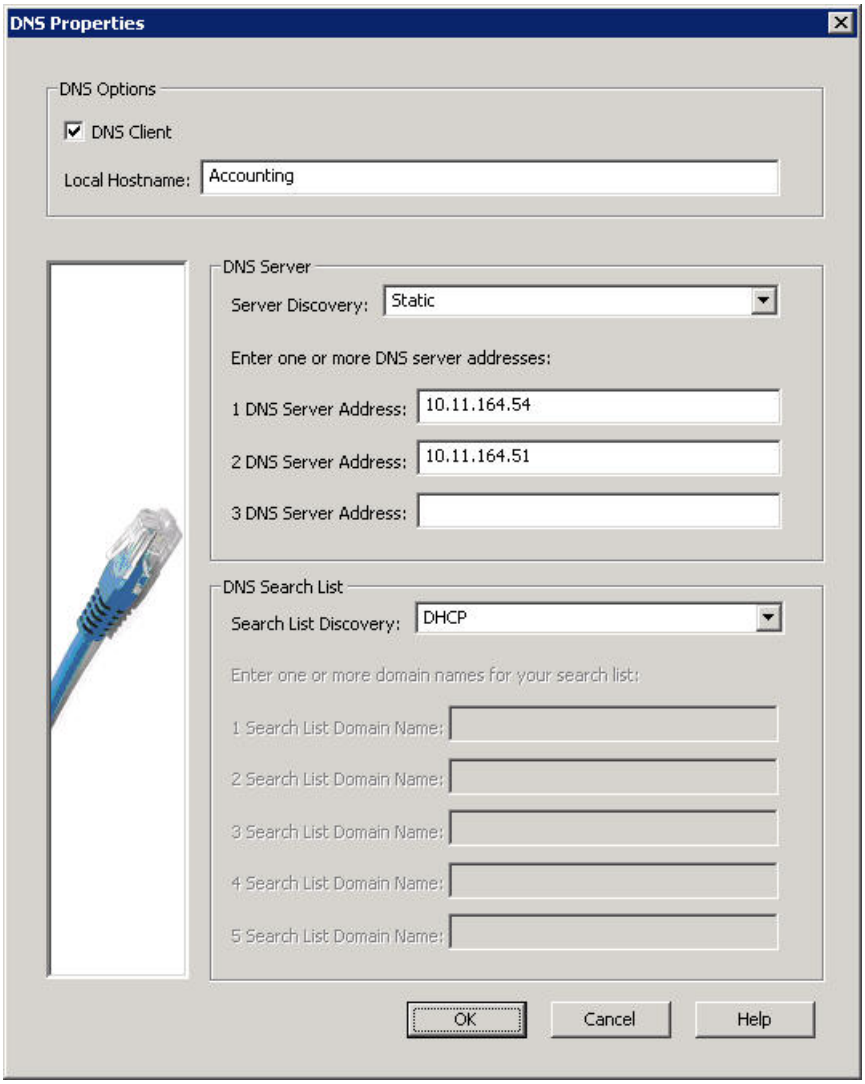

Figure 38 DNS Properties dialog box

2. Under DNS Options, complete the following:
   a. To enable DNS on the switch, select the **DNS Client** check box. To disable DNS on the switch, clear the check box.
   b. If you enable DNS, in the **Local Hostname** box, enter a valid local host name.

3. Under DNS Server, complete the following:
   a. From the Server Discovery list, select a method of DNS server discovery:
      - **Static**—Select this option to manually configure the list of DNS domain suffixes to be searched, enable the three DNS Server Address boxes and, optionally, define those values.
      - **DHCP**—Select this option to use Dynamic Host Configuration Protocol for IPv4. DHCP allows the switch to dynamically receive an IP address from a pool of addresses, instead of requiring it to have a static IP address. Use DHCP to acquire the IP configuration from a DHCP server. If no satisfactory lease is obtained, the DHCP client attempts to use the previously configured lease. If the previous lease cannot be used, no IP address is assigned to this switch, in order to avoid an IP address conflict. DHCP can also be used to distribute information that is not otherwise discoverable; for example, the DNS server addresses. (If you select **DHCP**, the DNS Server Address boxes become unavailable.)
      - **DHCPv6**—Select this option to use Dynamic Host Configuration Protocol for IPv6. DHCPv6 can be used to statefully assign addresses if the network administrator needs more control over addressing. It can also be used to distribute information that is not otherwise discoverable; for example, the DNS server. (If you select **DHCPv6**, the DNS Server Address boxes become unavailable.)
   b. If you selected **Static** for Server Discovery, optionally enter up to three valid addresses in the DNS Server Address boxes.

   Use the DNS Search List to specify up to five DNS domain suffixes to be used by the DNS client when attempting to resolve a host name into an IP address. For example, if the DNS Search List includes a single domain name “servers.mycompany.com” and a client attempted to look up the host name “myhost,” the DNS client will first request the IP address of the host name “myhost.” If that fails, it will request the IP address of the host name, “myhost.servers.mycompany.com.”
4. Under DNS Search List, complete the following:
   a. From the Search List Discovery list, select a method of assigning IP addresses:
      - **Static**—Select this option to manually configure the list of DNS domain suffixes to be searched.
      - **DHCP**—Select this option to use Dynamic Host Configuration Protocol for IPv4. DHCP allows the switch to dynamically receive an IP address from a pool of addresses, instead of requiring it to have a static IP address. DHCP can also be used to distribute information that is not otherwise discoverable; for example, the DNS domain used for name resolution. (If you select **DHCP**, the Search List Domain Name boxes become unavailable.)
      - **DHCPv6**—Select this option to use Dynamic Host Configuration Protocol for IPv6. DHCPv6 can be used to statefully assign addresses if the network administrator needs more control over addressing. DHCPv6 can also be used to distribute information that is not otherwise discoverable; for example, the DNS domain used for name resolution. (If you select **DHCPv6**, the Search List Domain Name boxes become unavailable.)
   b. If you selected **Static** for Search List Discovery, optionally enter up to five valid domain names in the Search List Domain Name boxes.
5. To save your changes to the switch DNS properties and close this dialog box, click **OK**. To close this dialog box without making changes, click **Cancel**.

Setting switch IP security

Network Internet Protocol security (IPsec) provides encryption-based security for IP version 4 (IPv4) and IP version 6 (IPv6) communications through the use of security policies and associations. Secure Sockets Layer (SSL) must be enabled before IP security can be configured.

IMPORTANT: IP security configurations can be complex. It is possible to unintentionally configure policies and associations that isolate a switch from all communication. If this happens, you can disable IP security by placing the switch in maintenance mode, and correct the problem through the serial port interface.

SAN Connection Manager provides the IPsec Configuration dialog box to help you configure IPsec, which is used to encrypt and authenticate IPv4 and IPv6 packets. Use the IPsec Configuration dialog box to create, edit, delete, copy, and paste IPsec associations (see "Managing security associations," page 64) and IPsec policies (see "Managing security policies," page 68).

Managing security associations

A *security association* defines the encryption algorithm and encryption key to apply when called by a security policy. A *security policy* may call several associations at different times, but each association is related to only one policy. The SAD is the set of all security associations.

This section provides the following procedures for managing IPsec associations:

- "Creating an IPsec association," page 64
- "Editing an IPsec association," page 67
- "Deleting an IPsec association," page 67
- "Copying and pasting IPsec associations," page 67

Creating an IPsec association

To create an IPsec association:

1. On the Adapter & Switch Management menu, click **Set Switch IPsec Information**. (If you have more than one switch in your SAN, the Switch Selection dialog box prompts you to select a switch, and then click **OK**.)

   The IPsec Configuration dialog box opens (Figure 39) and lists the existing IPsec Associations on the left and the existing IPsec Policies on the right.

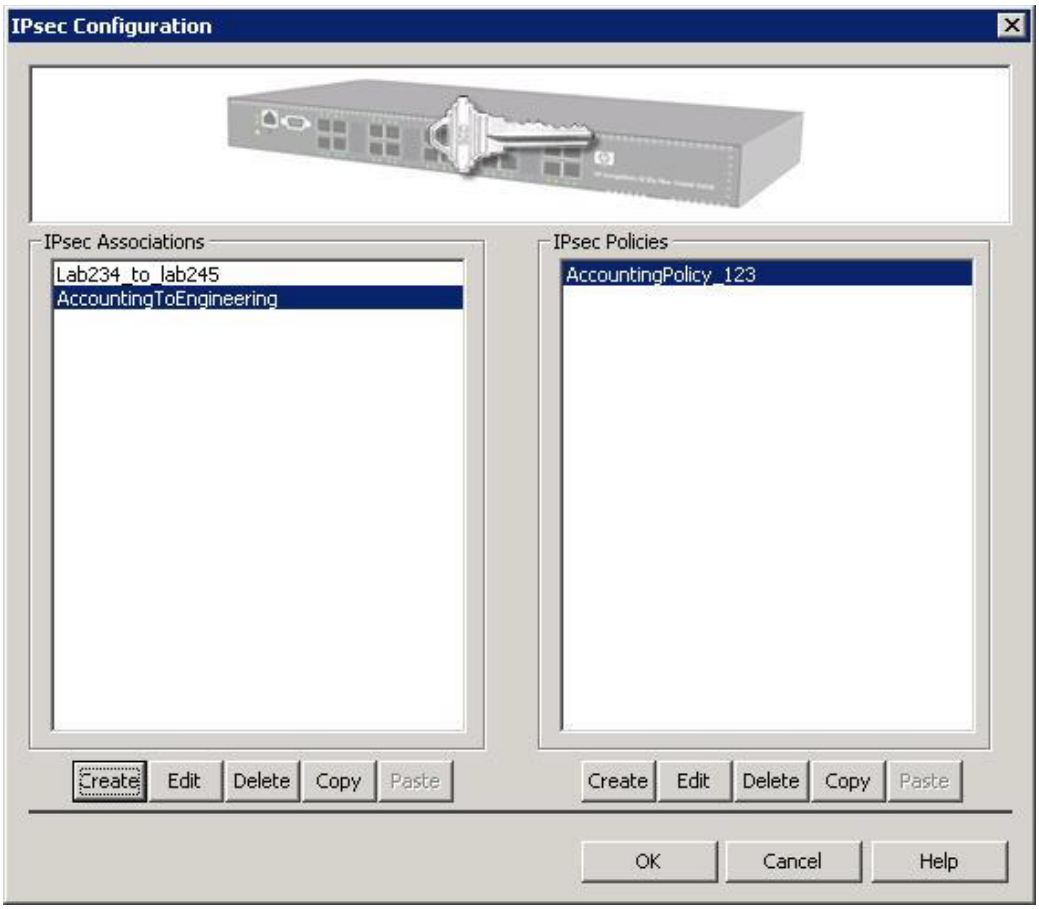

Figure 39 IPsec Configuration dialog box

2. Under IPsec Associations, click **Create**.
   The IPsec Association dialog box opens (Figure 40). You must complete all fields prefaced by a red asterisk.

NOTE: SAN Connection Manager allows you to create a maximum of 512 IPsec associations.

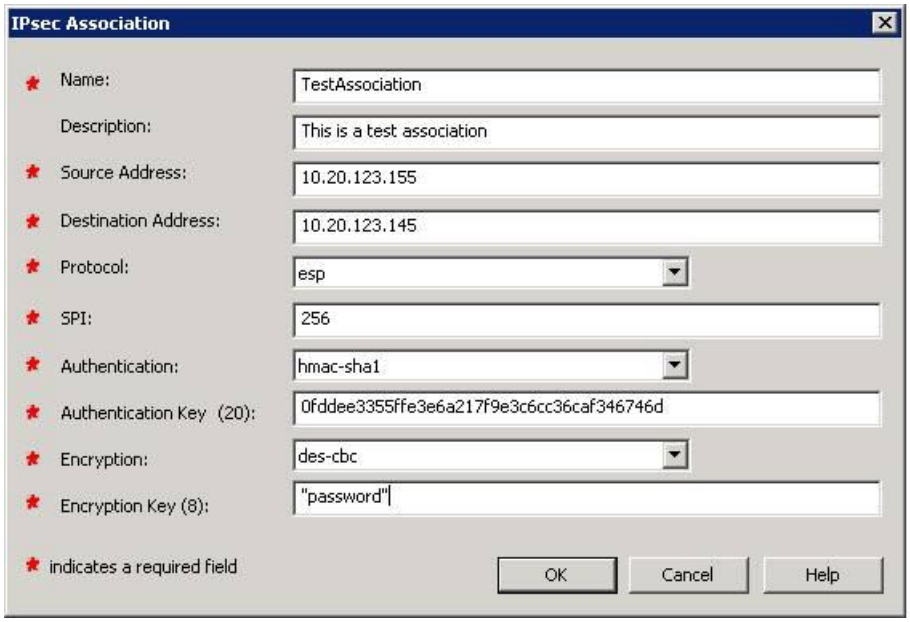

Figure 40 IPsec Association dialog box

3. Complete the IPsec Association dialog box as follows:

Name	Enter a unique alphanumeric name that starts with a letter, does not contain spaces, and does not exceed 32 characters. You may include the following special characters: ampersand (&), hyphen (-), circumflex (^), and underscore (_).
Description	(Optional) Enter a description of the IPsec policy.
Source Address	Enter either a valid IPv4 address, a valid IPv6 address, or a valid DNS host name.
Destination Address	Enter either a valid IPv4 address, a valid IPv6 address, or a valid DNS host name of the host, switch, or gateway from which data originates.
Protocol	Select one of the following IP security protocols to be used to process data: • **ESP**—Encapsulating Security Payload based on *RFC 2405: The ESP DES-CBC Cipher Algorithm With Explicit IV* (November 1998). • **ESP-old**—Encapsulating Security Payload based on *RFC 1827: IP Encapsulating Security Payload (ESP)* (August 1995) • **AH**—Authentication Header based on *RFC 2402: IP Authentication Header* (November 1998) • **AH-old**—Authentication Header based on *RFC 1826: IP Authentication Header* (August 1995) If you select **ESP** or **ESP-old**, you must also select the Encryption method and enter an Encryption Key.
SPI	Enter a SPI number in the range of 256 to 4294967295.

Authentication	Select one of the following methods to use to authenticate the source and destination address: • **HMAC-MD5**—Hash Message Authentication Code Message-Digest Algorithm 5 • **HMAC-SHA1**—Hash Message Authentication Code Secure Hash Algorithm 1 • **HMAC-SHA256**—Hash Message Authentication Code Secure Hash Algorithm 1 • **AES-XCBC-MAC**—Advanced Encryption Standard Extensions Cipher Block Chaining Message Authentication Code • **None**—Do not authenticate source and destination address
Authentication Key (*xx*)	Enter a string of hexadecimal bytes or a quoted string of characters that is converted into hexadecimal ASCII bytes. The allowed lengths (indicated by *xx* in the box label) for each authentication method are as follows: • For HMAC-MD5—16 bytes • For HMAC-SHA1—20 bytes • For HMAC-SHA256—32 bytes • For AES-XCBC-MAC—16 bytes
Encryption	(Required if you select **ESP** or **ESP-old** for the Protocol) Select one of the following methods used to encrypt outbound data or decrypt inbound data: • **DES-CBC**—Data Encryption Standard Cipher Block Chaining • **3DES-CBC**—Triple Data Encryption Standard Cipher Block Chaining • **NULL**—NULL encryption algorithm • **Blowfish-CBC**—Blowfish Cipher Block Chaining • **AES-CBC**—Advanced Encryption Standard Cipher Block Chaining • **Twofish-CBC**—Twofish Cipher Block Chaining
Encryption Key (*xx*)	(Required if you select **ESP** or **ESP-old** for the Protocol) Enter a string of bytes or a quoted string of characters that is converted into hexadecimal ASCII bytes. The allowed lengths (indicated by *xx* in the box label) for each encryption method are as follows: • For DES-CBC—8 bytes • For 3DES-CBC—24 bytes • For NULL—no key required • For Blowfish CBC—5–56 bytes • For AES-CBC—16/24/32 bytes • For Twofish-CBC—16–32 bytes

NOTE: IPsec associations must be unique. The unique key for an association includes the fields Destination Address, Protocol, and SPI. No two IPsec associations can contain duplicate values in these three fields.

4. To save the new IPsec association and close the IPsec Association dialog box, click **OK**. To abandon creation of the IPsec association, click **Cancel**.
5. When you are through managing security associations, select one of the following options:
   - To save your changes and close the IPsec Configuration dialog box, click **OK**.
   - To close the IPsec Configuration dialog box without saving any changes, click **Cancel**.

△ **CAUTION:** Be aware that if you click **Cancel** on the IPsec Configuration dialog box, *all* changes you have made to IPsec associations and policies are revoked. That is, all associations and policies that you have created, edited, deleted, copied, or pasted while the IPsec Configuration dialog box was open are nullified.

Editing an IPsec association

To edit an IPsec association:

1. On the Adapter & Switch Management menu, click **Set Switch IPsec Information**. (If you have more than one switch in your SAN, the Switch Selection dialog box prompts you to select a switch, and then click **OK**.)

   The IPsec Configuration dialog box opens (see Figure 39 on page 64) and lists the existing IPsec Associations on the left and the existing IPsec Policies on the right.
2. Under IPsec Associations, select the association that you want to modify, and then click **Edit**.

   The IPsec Association dialog box opens (Figure 40 on page 65).
3. Modify the existing security association settings, and then click **OK** to save your changes. (For an explanation on each of the fields on the IPsec Association dialog box, see "Creating an IPsec association," page 64.)
4. When you are through managing security associations, select one of the following options:
   - To save your changes and close the IPsec Configuration dialog box, click **OK**.
   - To close the IPsec Configuration dialog box without saving any changes, click **Cancel**.

△ **CAUTION:** Be aware that if you click **Cancel** on the IPsec Configuration dialog box, *all* changes you have made to IPsec associations and policies are revoked. That is, all associations and policies that you have created, edited, deleted, copied, or pasted while the IPsec Configuration dialog box was open are nullified.

Deleting an IPsec association

To delete an IPsec association:

1. On the Adapter & Switch Management menu, click **Set Switch IPsec Information**. (If you have more than one switch in your SAN, the Switch Selection dialog box prompts you to select a switch, and then click **OK**.)

   The IPsec Configuration dialog box opens (see Figure 39 on page 64) and lists the existing IPsec Associations on the left and the existing IPsec Policies on the right.
2. Under IPsec Associations, select the association that you want to remove, and then click **Delete**.
3. When you are through managing security associations, click **OK** to save your changes and close the IPsec Configuration dialog box. To close the IPsec Configuration dialog box without saving any changes, click **Cancel**.

△ **CAUTION:** Be aware that if you click **Cancel** on the IPsec Configuration dialog box, *all* changes you have made to IPsec associations and policies are revoked. That is, all associations and policies that you have created, edited, deleted, copied, or pasted while the IPsec Configuration dialog box was open are nullified.

Copying and pasting IPsec associations

To simplify the process of creating IPsec associations, you can copy an existing association, paste it, modify it as needed, and then save it under a new name. For example, if you use the same protocols and keys for all IPsec associations, you can configure one complete association, and then copy it to create additional associations with different source or destination addresses.

To copy and paste an IPsec association:

1. On the Adapter & Switch Management menu, click **Set Switch IPsec Information**. (If you have more than one switch in your SAN, the Switch Selection dialog box prompts you to select a switch, and then click **OK**.)

   The IPsec Configuration dialog box opens (see Figure 39 on page 64) and lists the existing IPsec Associations on the left and the existing IPsec Policies on the right.
2. Under IPsec Associations, select the association that you want to copy, and then click **Copy**.
3. Under IPsec Associations, click **Paste**.

   SAN Connection Manager lists the new association under IPsec Associations. It appends the string "_Copy_0" to the original name; for example, a copy of *MyAssociationName* becomes *MyAssociationName*_Copy_0. If an association already exists with that name, it appends the string "_Copy_1", and so on.
4. To modify the copy, select it, and then click **Edit** to open the IPsec Association dialog box (Figure 40 on page 65).
5. Make changes as needed, and, optionally, save the copy with a new association name.
6. When you are through managing security associations, select one of the following options:
   - To save your changes and close the IPsec Configuration dialog box, click **OK**.
   - To close the IPsec Configuration dialog box without saving any changes, click **Cancel**.

△ **CAUTION:** Be aware that if you click **Cancel** on the IPsec Configuration dialog box, *all* changes you have made to IPsec associations and policies are revoked. That is, all associations and policies that you have created, edited, deleted, copied, or pasted while the IPsec Configuration dialog box was open are nullified.

Managing security policies

The SPD is the set of all security policies configured on the switch. A security policy defines the following parameters:

- Connection source and destination
- Data traffic direction: inbound or outbound
- Protocols for which to protect data traffic
- Security protocols: AH or ESP
- Level of protection: IP security, discard, or none

Policies can define security for host-to-host, host-to-gateway, and gateway-to-gateway connections; one policy for each direction. For example, to secure the connection between two hosts, you need two policies: one for outbound traffic from the source to the destination, and another for inbound traffic to the source from the destination. You can specify sources and destinations by IP addresses (version 4 or 6) or DNS host names. If a host name resolves to more than one IP address, the switch creates the necessary policies and associations. You can recognize these dynamic policies and associations because their names begin with DynamicSP_ and DynamicSA_, respectively.

You can apply IP security to all communication between two systems, or you can select protocols, such as ICMP, TCP, or UDP. Furthermore, instead of applying IP security, you can choose to discard all inbound or outbound traffic, or allow all traffic without encryption. Both the AH and ESP security protocols provide source authentication, ensure data integrity, and protect against replay.

This section includes the following procedures for managing security policies:

- "Creating an IPsec policy," page 69
- "Editing an IPsec policy," page 72
- "Deleting an IPsec policy," page 73
- "Copying and pasting IPsec polices," page 73

Creating an IPsec policy

To create an IPsec policy:

1. On the Adapter & Switch Management menu, click **Set Switch IPsec Information**. (If you have more than one switch in your SAN, the Switch Selection dialog box prompts you to select a switch, and then click **OK**.)

   The IPsec Configuration dialog box opens (Figure 41) and lists the existing IPsec Associations on the left and the existing IPsec Policies on the right.

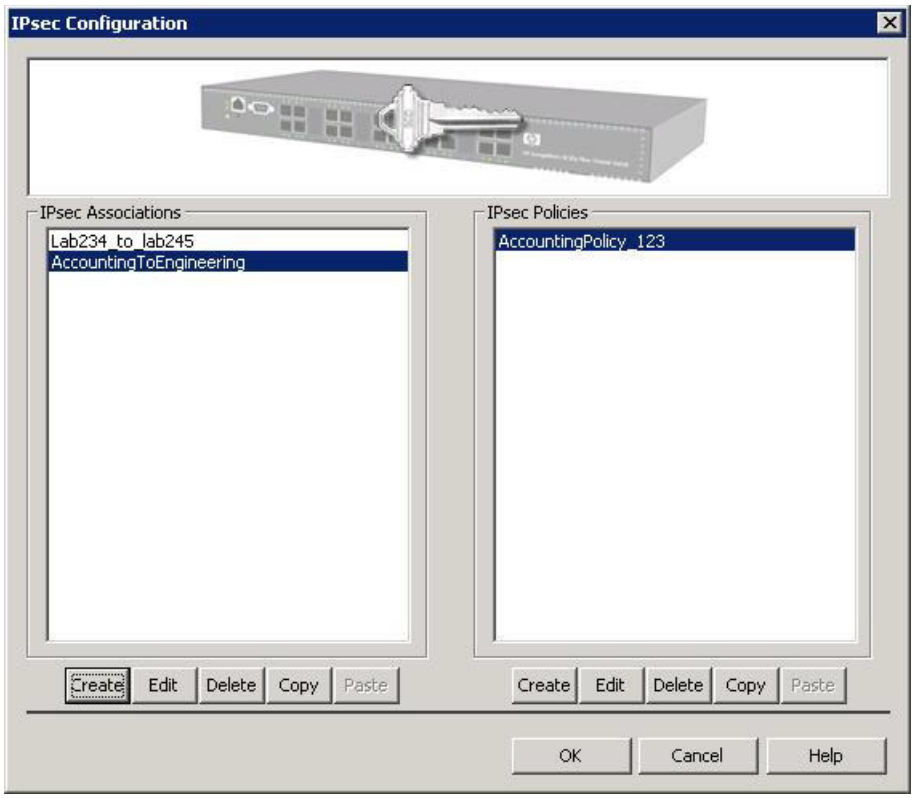

Figure 41 IPsec Configuration dialog box

2. Under IPsec Policies, click **Create**.
   The IPsec Policy dialog box opens (Figure 42). You must complete all fields prefaced by a red asterisk.

NOTE: SAN Connection Manager allows you to create a maximum of 128 IPsec policies.

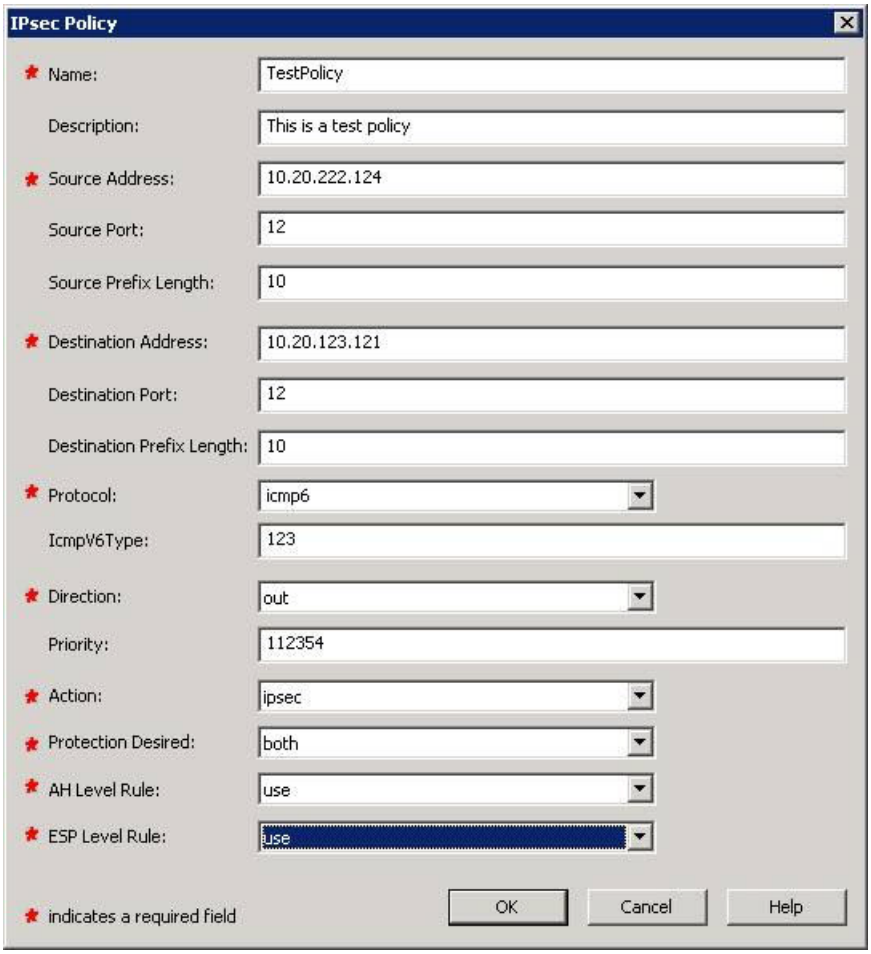

Figure 42 IPsec Policy dialog box

3. Complete the IPsec Policy dialog box as follows:

Name	Enter a unique alphanumeric name that starts with a letter, does not contain spaces, and does not exceed 32 characters. You may include the following special characters: ampersand (&), hyphen (-), circumflex (^), and underscore (_).
Description	(Optional) Enter a description of the IPsec policy.
Source Address	Enter either a valid IPv4 address, a valid IPv6 address, or a valid DNS host name.
Source Port	(Optional) Enter a number in the range of 1 to 65535.
Source Prefix Length	(Optional) Specify the length of the prefix in the source address by entering a number in the range of 0 to 64.
Destination Address	Enter either a valid IPv4 address, a valid IPv6 address, or a valid DNS host name of the host, switch, or gateway receiving data. If you entered an IP address for the Source Address, the Destination Address must use the same IP version format.
Destination Port	(Optional) Specify the destination port number by entering a number in the range of 1 to 65535.

Destination Prefix Length	(Optional) Specify the IPv4 or IPv6 subnet mask length by entering a number in the range of 0 to 64. For IPv4 [0..32]; for IPv6 [0..128].
Protocol	Select one of the following protocols or applications to which to apply IP security: • **ICMP**—Internet Control Message Protocol • **ICMP6**—Internet Control Message Protocol for IPv6 • **IP4**—Internet Protocol, version 4 • **TCP**—Transmission Control Protocol • **UDP**—User Datagram Protocol • **Any**—Any protocol Or enter a number in the range of 0 to 255. If you select ICMP6, you must also enter a value in the ICMP IPv6 Type box.
ICMP IPv6 Type	(Required if you select ICMP6 for the Protocol) In the ICMP IPv6 Type box, enter a number in the range of 0 to 255.
Direction	Select the direction of data traffic to which to apply the policy: • **In**—Data entering the destination • **Out**—Data leaving the source
Priority	To control the relative ordering of this policy within the SPD, enter an integer in the range of –2147483647 to 214783647.
Action	Specify the processing to apply to data traffic: • **Discard**—Unconditionally disallow all inbound or outbound data traffic • **None**—Allow all inbound or outbound data traffic without encryption or decryption • **IPsec**—Apply IP security to inbound and outbound data traffic
Protection Desired	(Required if you select IPsec for the Action) Select the type of IP security protection to apply: • **AH**—Authentication Header • **ESP**—Encapsulating Security Payload • **Both**—Apply both AH and ESP protection
AH Level Rule	(Required if you select AH or Both for the Protection) Select the rule level to apply for AH protection: • **Default**—For Linux, the default is Use. For Windows, the default is Require. • **Use**—If corresponding SAD entry is found, use IPsec. If corresponding SAD entry is not found, do not use IPsec. • **Require**—If corresponding SAD is entry found, use IPsec. If corresponding SAD entry is not found, do not communicate at all.
ESP Level Rule	(Required if you select ESP or Both for the Protection) Select the rule level to apply for ESP protection: • **Default**—For Linux, the default is Use. For Windows, the default is Require. • **Use**—If corresponding SAD entry is found, use IPsec. If corresponding SAD entry is not found, do not use IPsec. • **Require**—If corresponding SAD is entry found, use IPsec. If corresponding SAD entry is not found, do not communicate at all.

NOTE: IPsec policies must be unique. The unique key for a policy includes the fields Source Address, Source Port, Source Prefix Length, Destination Address, Destination Port, Destination Prefix Length, Protocol, ICMP IPv6 Type (if specified), and Direction. No two IPsec associations can contain duplicate values in these nine fields.

4. To save the new IPsec policy and close the IPsec Policy dialog box, click **OK**. To abandon creation of the IPsec policy, click **Cancel**.
5. When you are through managing security policies, select one of the following options:
   - To save your changes and close the IPsec Configuration dialog box, click **OK**.
   - To close the IPsec Configuration dialog box without saving any changes, click **Cancel**.

CAUTION: Be aware that if you click **Cancel** on the IPsec Configuration dialog box, *all* changes you have made to IPsec associations and policies are revoked. That is, all associations and policies that you have created, edited, deleted, copied, or pasted while the IPsec Configuration dialog box was open are nullified.

Editing an IPsec policy

To edit an IPsec policy:

1. On the Adapter & Switch Management menu, click **Set Switch IPsec Information**. (If you have more than one switch in your SAN, the Switch Selection dialog box prompts you to select a switch, and then click **OK**.)

   The IPsec Configuration dialog box opens (see Figure 41 on page 69) and lists the existing IPsec Associations on the left and the existing IPsec Policies on the right.
2. Under IPsec Policies, select the policy that you want to modify, and then click **Edit**.

   The IPsec Policy dialog box opens (Figure 42 on page 70).
3. Modify the existing security policy settings, and then click **OK** to save your changes. (For an explanation on each of the fields on the IPsec Policy dialog box, see "Creating an IPsec policy," page 69.)
4. When you are through managing security policies, select one of the following options:
   - To save your changes and close the IPsec Configuration dialog box, click **OK**.
   - To close the IPsec Configuration dialog box without saving any changes, click **Cancel**.

CAUTION: Be aware that if you click **Cancel** on the IPsec Configuration dialog box, *all* changes you have made to IPsec associations and policies are revoked. That is, all associations and policies that you have created, edited, deleted, copied, or pasted while the IPsec Configuration dialog box was open are nullified.

Deleting an IPsec policy

To delete an IPsec policy:

1. On the Adapter & Switch Management menu, click **Set Switch IPsec Information**. (If you have more than one switch in your SAN, the Switch Selection dialog box prompts you to select a switch, and then click **OK**.)

   The IPsec Configuration dialog box opens (see Figure 41 on page 69) and lists the existing IPsec Associations on the left and the existing IPsec Policies on the right.
2. Under IPsec Policies, select the policy that you want to remove, and then click **Delete**.
3. When you are through managing security policies, select one of the following options:
   - To save your changes and close the IPsec Configuration dialog box, click **OK**.
   - To close the IPsec Configuration dialog box without saving any changes, click **Cancel**.

△ **CAUTION:** Be aware that if you click **Cancel** on the IPsec Configuration dialog box, *all* changes you have made to IPsec associations and policies are revoked. That is, all associations and policies that you have created, edited, deleted, copied, or pasted while the IPsec Configuration dialog box was open are nullified.

Copying and pasting IPsec polices

To simplify the process of creating IPsec policies, you can copy an existing policy, paste it, modify it as needed, and then save it under a new name. For example, if you use the same protocols and keys for all IPsec policies, you can configure one complete policy, and then copy it to create additional policies with different source or destination addresses.

To copy and paste an IPsec policy:

1. On the Adapter & Switch Management menu, click **Set Switch IPsec Information**. (If you have more than one switch in your SAN, the Switch Selection dialog box prompts you to select a switch, and then click **OK**.)

   The IPsec Configuration dialog box opens (see Figure 41 on page 69) and lists the existing IPsec Associations on the left and the existing IPsec Policies on the right.
2. Under IPsec Policies, select the policy that you want to copy, and then click **Copy**.
3. Under IPsec Policies, click **Paste**.

   SAN Connection Manager lists the new policy under IPsec Policies. It appends the string "_Copy_0" to the original name; for example, a copy of *MyPolicyName* becomes *MyPolicyName*_Copy_0. If a policy already exists with that name, it appends the string `_Copy_1`, and so on.
4. To modify the copy, select it, and then click **Edit** to open the IPsec Policy dialog box (Figure 42 on page 70).
5. Make changes as needed, and, optionally, save the copy with a new policy name.
6. When you are through managing security policies, select one of the following options:
   - To save your changes and close the IPsec Configuration dialog box, click **OK**.
   - To close the IPsec Configuration dialog box without saving any changes, click **Cancel**.

△ **CAUTION:** Be aware that if you click **Cancel** on the IPsec Configuration dialog box, *all* changes you have made to IPsec associations and policies are revoked. That is, all associations and policies that you have created, edited, deleted, copied, or pasted while the IPsec Configuration dialog box was open are nullified.

6 Managing HBAs

This chapter provide procedures for managing your HP HBAs using SAN Connection Manager.

Viewing HBA information

SAN Connection Manager provides easy access to information about each HBA within your SAN.

To view information about an HBA:

1. In the Server-Storage View group of the navigation pane, click the HBA you want to view. The content pane (Figure 43) shows the FC HBA Information for that HBA.

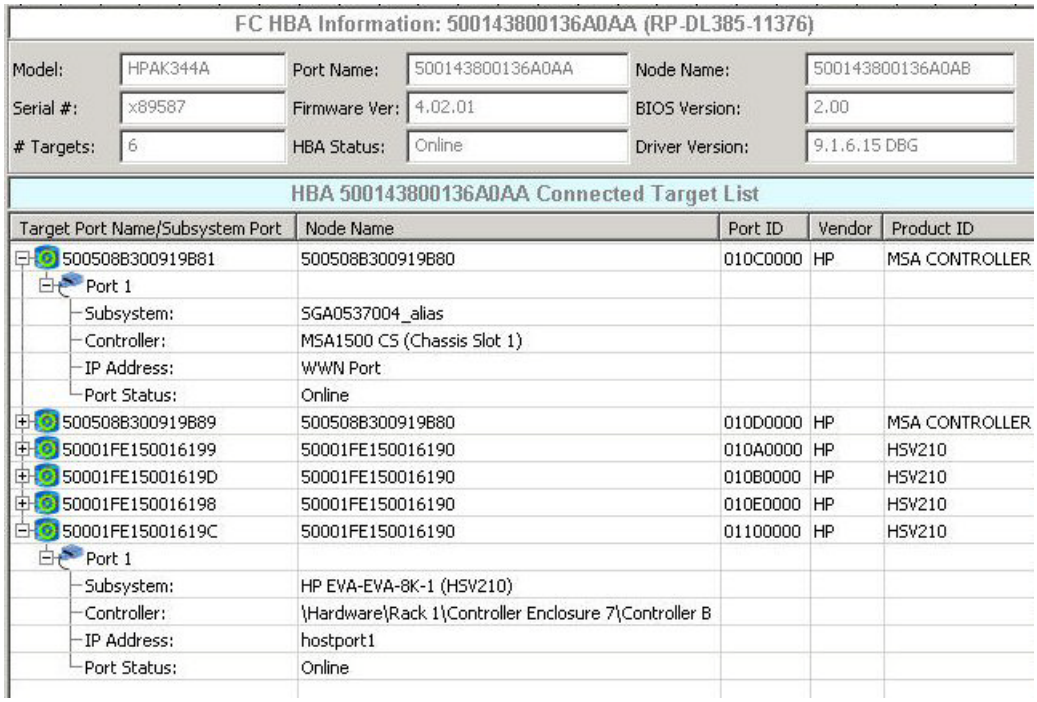

Figure 43 FC HBA Information

The FC HBA Information includes the following read-only information:

- FC HBA Information:
  - Model
  - Serial #
  - # Targets
  - Port Name
  - Firmware Version
  - HBA Status
  - Node Name
  - BIOS Version
  - Driver Version
- HBA Connected Target List:
  - Target Port Name/Subsystem Port (see note)
  - Node Name
  - Port ID
  - Vendor
  - Product ID

NOTE: The Target Port Name/Subsystem Port column lists the names of the target ports connected to the HBA. Click the + symbol to the left of the Target Port Name to reveal the name of the matching port on the subsystem in the SAN. Click the + symbol to the left of the Subsystem Port Name to reveal the identifiers of the subsystem, controller, and IP address, and the port status.

Updating an HBA BIOS image

SAN Connection Manager provides an easy way to update the BIOS images of HP QLogic-based FC HBAs within your SAN.

NOTE: This feature is not supported with Emulex based HBAs.

To update an HBA BIOS:

1. To access the Update HBA BIOS wizard, choose one of the following options:
   - On the Adapter & Switch Management menu, click **Update HBA BIOS**.
   - In the content pane's Physical Connection or LUN Assignment map, right-click the server icon to select that specific server to update HBA BIOS, and then on the shortcut menu, click **Update HBA BIOS**.

   The Update HBA BIOS wizard opens.
2. If a specific server is selected, click **Next** to go to step 4.

   If no specific server is selected, in the Available Server(s) list, select the server or servers for which you want to update the HBA BIOS by choosing one of the following options:
   - Select a server on the Available Server(s) list, and then click **Add**. This updates the BIOS of the HBAs installed on this server.
   - To add all of the listed servers, click **Add All**. This updates the BIOS of the HBAs installed on all servers.

   NOTE: If you select and add a server by mistake, select that server on the Selected Server(s) list, and then click **Remove**. To clear the Selected Server(s) list and start the selection process again, click **Remove All**.
3. Click **Next**. (Next is disabled until you select at least one server and add it to the Selected Server(s) list.)
4. In the List of HBAs to Update BIOS column, select the server to update, and then click **Select HBA BIOS File**.
5. Download the `.zip` file from the HP website and extract its contents.
6. Navigate to the folder containing the `.bin` file for the family of HBAs selected.

   NOTE: A BIOS image file generally has the file extension `bin`.
7. Select the appropriate `.bin` file, and then click **Open**.
8. A message box asks if you want to apply this BIOS image to all HBAs in the same family. To use the selected BIOS image for all the HBAs in the same family, including HBAs on other servers, click **Yes**. To apply the BIOS image to only the selected HBA, click **No**.

   The wizard's BIOS File column shows the file name selected in step 7.
9. Click **Server Agent Password**. (You must enter a valid password to complete this procedure.)

   NOTE: The default server agent password is *`config`*. To change this password for each server, see "Setting a server agent password," page 104.

10. In the Password to change the server's HBA configuration dialog box (Figure 44), enter the password, and then click **OK**.

Figure 44 Password to change the server's HBA configuration dialog box

NOTE: The same password applies for all the HBAs in the server. If more than one server is in the list, you must enter the password for each server.

11. In the Update HBA BIOS wizard (Figure 45), click **Next**.

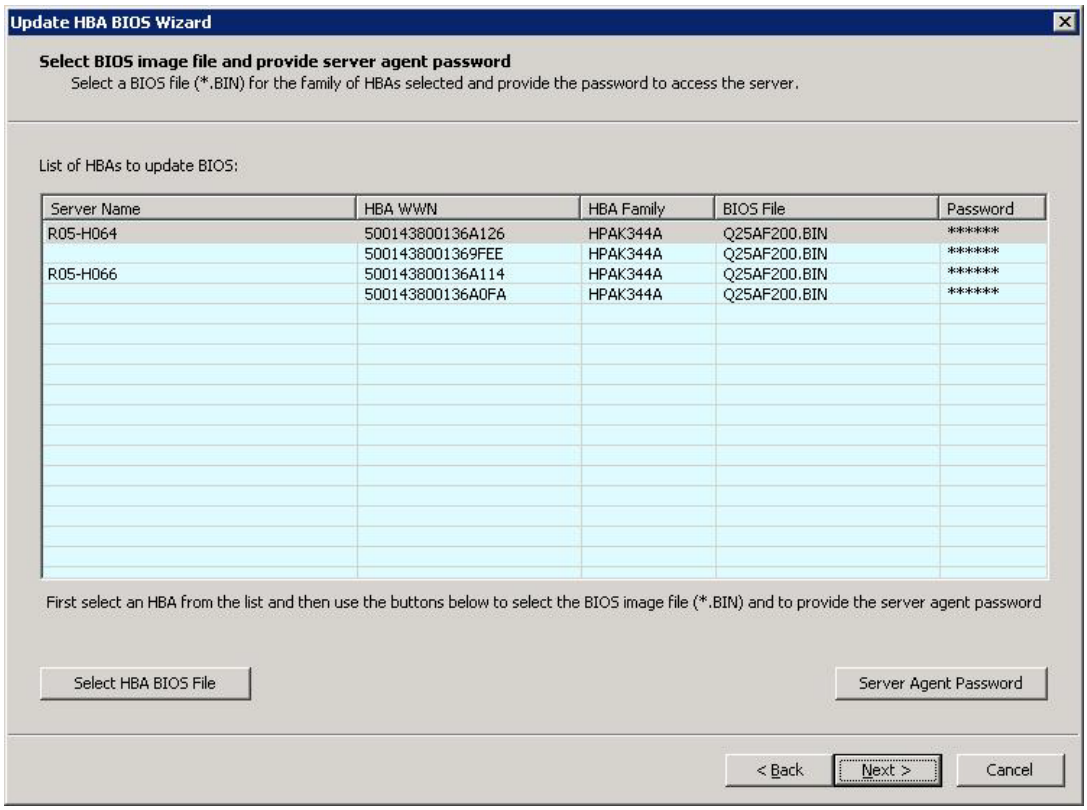

Figure 45 Update HBA BIOS wizard

12. To complete the Update HBA BIOS wizard, choose one of the following options:
    - To confirm and proceed with the BIOS update, click **Finish**.
    - To change your selections for BIOS update, click **Back**.
    - To stop BIOS update, click **Cancel**.

    If you clicked **Finish**, a message box states the HBAs are ready to be updated. This process takes a while and the system is temporarily unresponsive.
13. When prompted to update the HBAs, click **Yes**.

Updating an HBA driver

SAN Connection Manager provides an easy way to update both Windows and Linux drivers for HP Q-Logic-based FC HBAs within your SAN. Before you begin, visit the HP website to download the latest driver file. (SAN Connection Manager may have prompted you to download a driver file if it detected an out-of-date file when you started the application.)

NOTE: This feature is not supported with Emulex based HBAs.

To update an HBA driver:

1. To access the HBA Driver Update wizard, choose one of the following options:
   - On the Adapter & Switch Management menu, click **Update HBA Driver**.
   - In the content pane's Physical Connection or LUN Assignment map, right-click the server icon. Then on the shortcut menu, click **Update HBA Driver** to select that specific server to update the HBA driver.

   The HBA Driver Update wizard opens.
2. If a specific server is selected, click **Next** to go to step 3.

   If no specific server is selected, in the Available Server(s) list, select the server for which you want to update the HBA driver:
   - Select a server on the Available Server(s) list, and then click **Add**. This updates the driver of the HBAs installed on this server.
   - To add all of the listed servers, click **Add All**. This updates the driver of the HBAs installed on all servers.

   NOTE: If you select and add a server by mistake, select that server on the Selected Server(s) list, and then click **Remove**. To clear the Selected Server(s) list and start the selection process again, click **Remove All**.
3. Click **Next**. (Next is disabled until you select at least one server and add it to the Selected Server(s) list.)
4. In the List of HBAs to update driver, select the HBA you want to update, and then click **Select HBA Driver File**.
5. Navigate to the folder containing either the Windows `.exe` file, or the Linux `.gz`, `.rpm`, `.tar`, or `.tgz` file for the selected HBA.
6. Select the appropriate driver file, and then click **Open**.

   The wizard's Driver File column shows the file name. The same driver file is automatically populated to all the HBAs that belong to the same family, including HBAs on other servers.
7. Click **Server Agent Password**. (You must enter a valid password to complete this procedure.)

   NOTE: The default Server Agent Password is *`config`*. To change this password for each server, see "Setting a server agent password," page 104.

8. In the Password to change the server's HBA configuration dialog box (Figure 44), enter the password, and then click **OK**. The same password applies for all the HBAs in the server. If more than one server is in the list, you must enter the password for each server.

Figure 46 Password to change the server's HBA configuration dialog box

The HBA Driver Update wizard (Figure 47) should now show all columns completed.

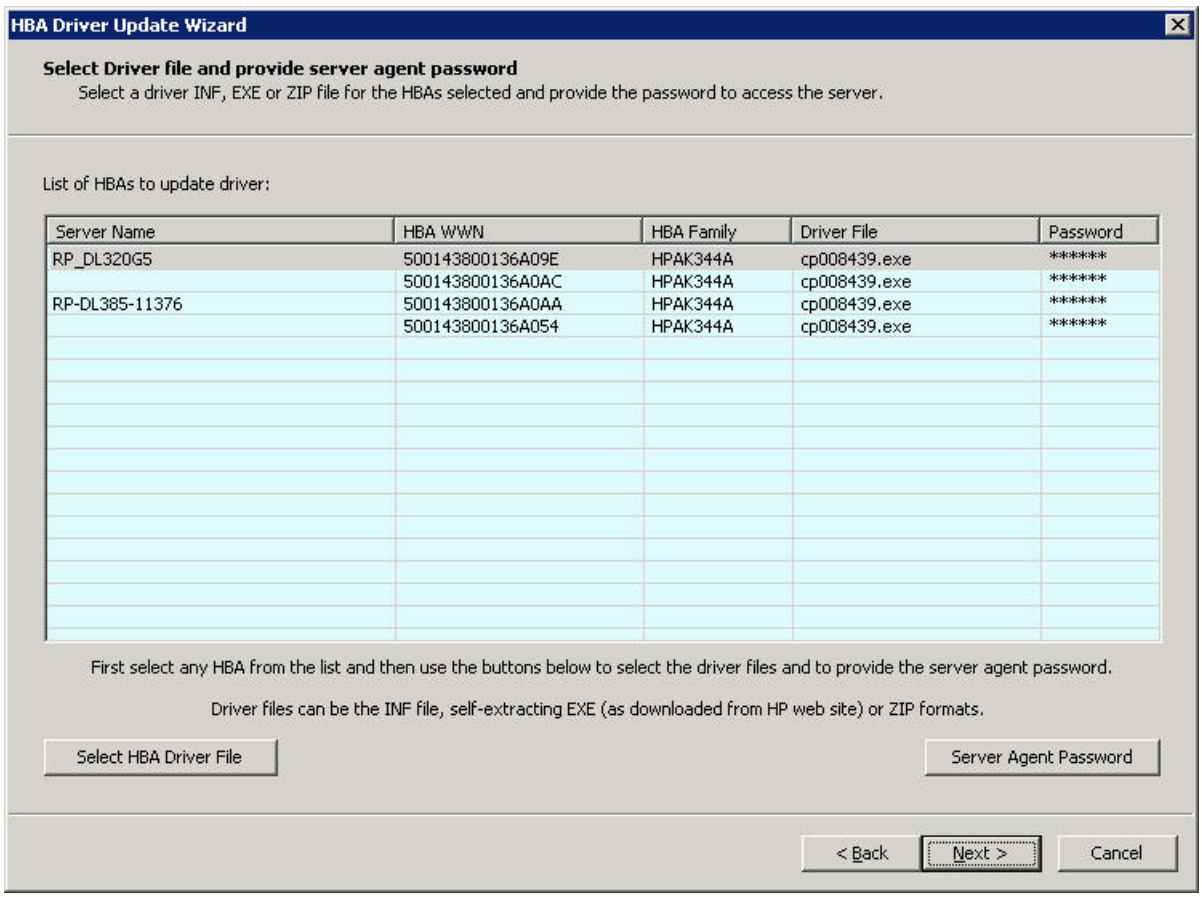

Figure 47 HBA Driver Update wizard

9. Click **Next**.
10. To complete the HBA Driver Update wizard, choose one of the following options:
    - To confirm and proceed with the driver update, click **Finish**.
    - To change your selections for the driver update, click **Back**.
    - To stop the driver update, click **Cancel**.

    If you clicked **Finish**, a message box states the HBAs are ready to be updated. The update takes a while and cannot be canceled.
11. Click **Yes** when prompted to update the HBAs.

NOTE: In the unlikely event of using an unsigned HP FC HBA Windows driver, a Hardware Installation message states the software "has not passed Windows Logo testing." If you still want to update the HBA driver with the unsigned driver, click **Continue Anyway**. If you do not want to use the unsigned driver, click **STOP Installation**.

When you update a remote server's HBAs with an unsigned driver, the Hardware Installation message appears on the remote server and the SAN Connection Manager server is not aware of the message that requires manual selection. If no action is taken on the remote server, SAN Connection Manager times out after about three to four minutes and shows a message that the driver update has been successful but needs to be rebooted to complete. To proceed with the update on the remote server using the unsigned driver, click **Continue Anyway** on that server. If you do not want to use the unsigned driver, click **STOP Installation**.

Creating an alias for an HBA

You can create alias (user-friendly) names for HBAs to help you easily identify them in SAN Connection Manager.

To create an alias for an HBA:

1. On the LUN Assignment or Physical Connection map, right-click a HBA icon, and then on the shortcut menu, click **Create HBA Alias**.

   The Create HBA Alias dialog box (Figure 48) shows the HBA port name and server name.

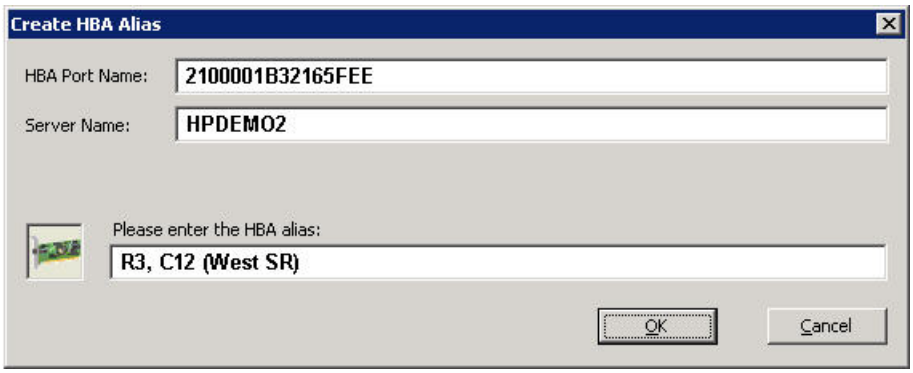

Figure 48 Create HBA Alias dialog box

2. Enter an alias name to replace the HBA name, and then click **OK**.

   The Physical Connection and LUN Assignment maps are updated with the new HBA alias name.

Manually entering FDMI information

If SAN Connection Manager detects any HBA without a server name or OS type, a message appears informing you that the HBA FDMI is either disabled or failed to register the required information. SAN Connection Manager then asks if you want to manually enter the HBA's host name and OS type, or if you want to check the HBA FDMI service status.

- If you choose to check the HBA FDMI service status, a message warns you that you must either reload the HBA driver, reset the HBA, or even reboot the server for the FDMI data to be registered into the switch, and that you must close and restart SAN Connection Manager for it to discover any new FDMI data.
- If you choose to manually enter the data, follow these steps. (The HBA information you enter will be saved in SAN Connection Manager so that you will not be prompted again.)

To manually enter the HBA server name and OS type:

1. To enter FDMI information, respond **Yes**/**OK** to the prompt to manually enter the HBA's host name and OS type.

   The Enter HBA Server Name and OS Type dialog box (Figure 49) lists all the HBAs with either a missing Server Name, Server OS, or both.

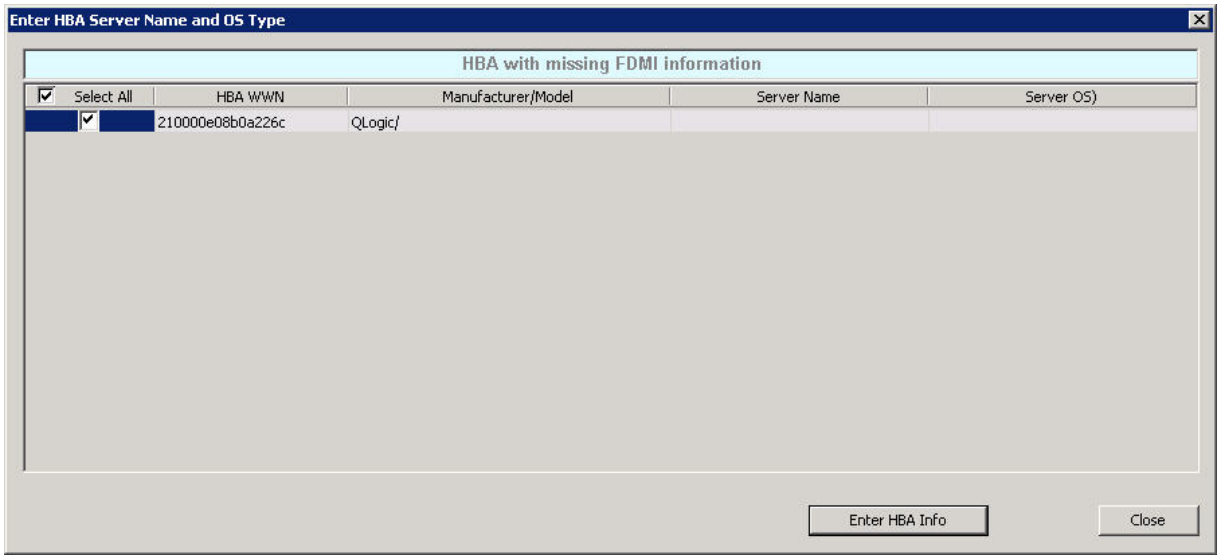

Figure 49 Enter HBA Server Name and OS Type dialog box

NOTE: You can also access the Enter HBA Server Name and OS Type dialog box by opening the Advanced Operations menu, and then clicking **Edit Manual FDMI List**.

2. From the list of HBAs with missing FDMI information, select the check box next to one or more HBAs. To select all HBAs, select the **Select All** check box.

   When at least one HBA is selected, the Enter HBA Info button is enabled.

3. Click **Enter HBA Info**.

   The HBA Server Name and OS Type dialog box (Figure 50) opens.

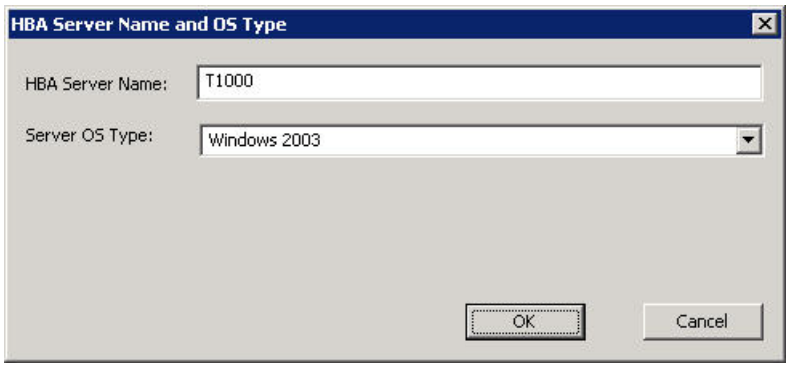

Figure 50 HBA Server Name and OS Type dialog box

4. In the **HBA Server Name** box, type a server name for the HBA.
5. Select the operating system type for the server from the **Server OS Type** list, or type in the OS name.
6. To save this data for the HBA and close this dialog box, click **OK**. To close this dialog box without saving the HBA data, click **Cancel**.

   The Enter HBA Server Name and OS Type dialog box in Figure 49 shows the server name and OS type that you entered in the dialog box shown in Figure 50.

7. Click **Close** to save this information and exit the dialog box.

7 Managing Logical Disks

This chapter provides procedures for viewing and managing LUNs using SAN Connection Manager.

Viewing logical disk information

SAN Connection Manager provides easy access to information about each logical disk within your SAN.

To view information about a logical disk:

1. In the navigation pane under the Storage subsystem-Logical Disk View group, click the logical disk you want to view.

   The content pane (Figure 51) shows the logical disk information.

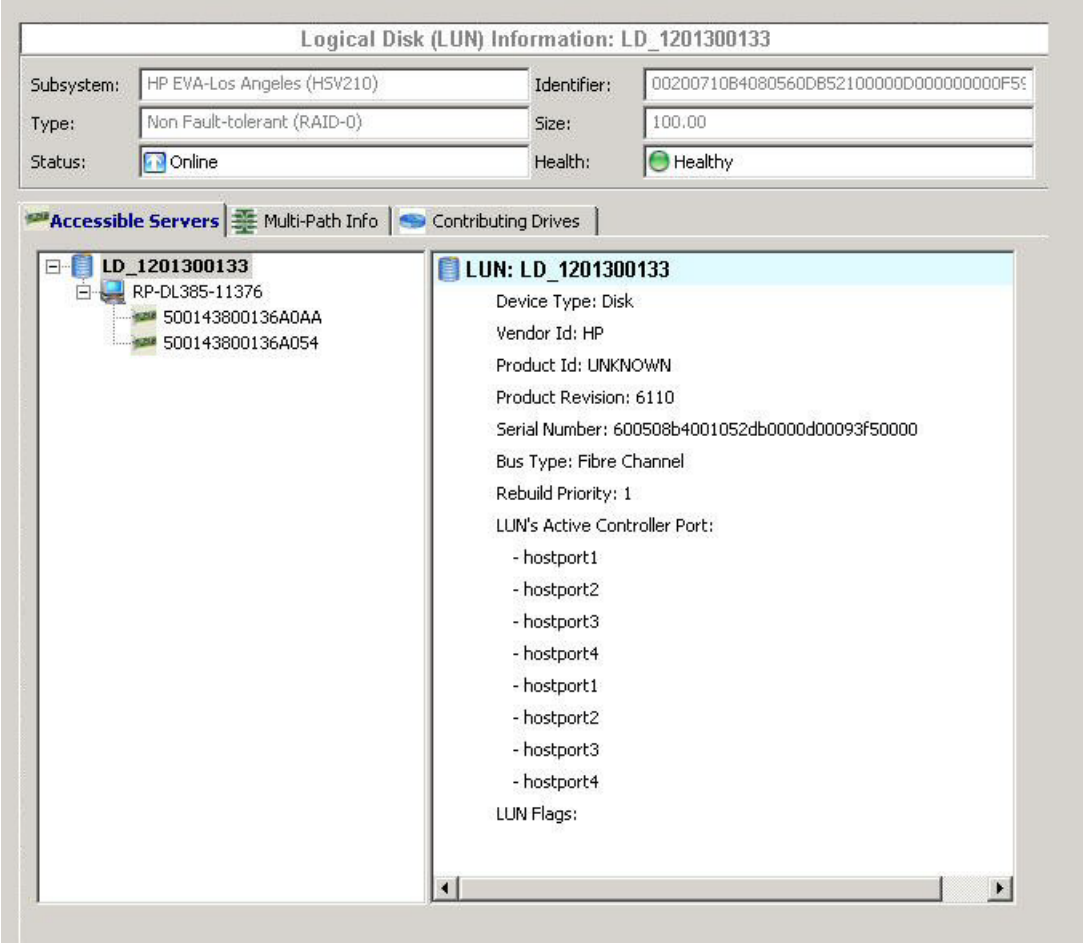

Figure 51 Logical Disk (LUN) Information

The read-only information under LUN Information includes the following:

- Subsystem
- Type
- Status
- Identifier
- Size
- Health

2. To view additional information about the selected logical disk, click the following tabs:
   - Accessible Servers—Lists servers available to this logical disk.
   - Multi-path Info—Provides information about LUN load balancing.
   - Contributing Drives—Provides details about contributing drives.

NOTE: The Multi-path Info tab information is only available to LUNs presented to the server running SAN Connection Manager.

Creating a logical disk—EVA storage

The Create New Logical Disk wizard assists with the creation of logical disks from the storage arrays (subsystems) within your SAN. Use the following procedure to create a logical disk from an HP EVA storage array. (If your storage array type is MSA, see "Creating a logical disk—MSA storage," page 88.)

To create a logical disk for EVA storage:

1. To access the Create New Logical Disk wizard, choose one of the following options:
   - On the Logical Disk Operations menu, click **Create New Logical Disk**.
   - In the navigation pane or the content pane's topology map, right-click the subsystem icon to select a specific EVA subsystem from which to create a logical disk, and then on the shortcut menu, click **Create Logical Disk from Storage Subsystem**.

   The Create New Logical Disk wizard opens.
2. If no specific subsystem is selected and there is more than one subsystem in the SAN, select from the subsystem list the EVA subsystem on which you want the logical disk(s) created, and then click **Next**.

   The New Logical Disk Parameters dialog box (Figure 52) opens.

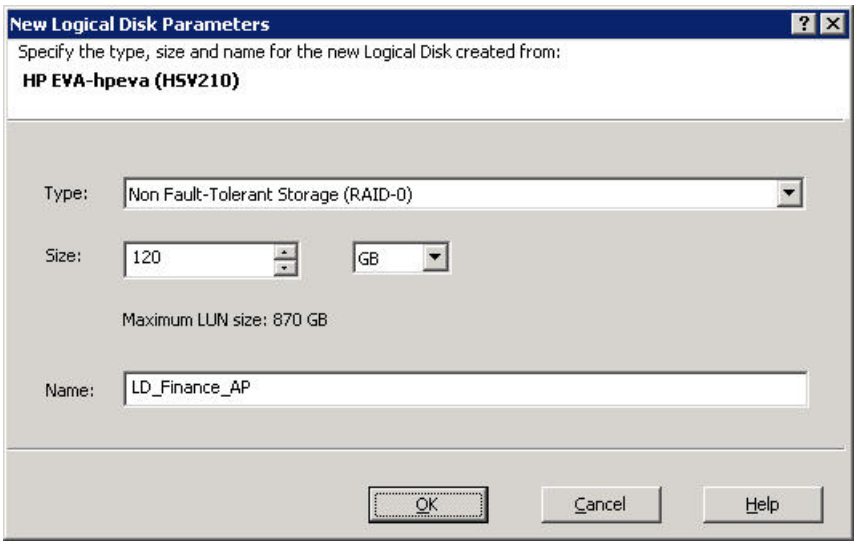

Figure 52 New Logical Disk Parameters dialog box (EVA storage)

3. Specify the following logical disk parameters, and then click **OK**:
   - Type—From the list, select the class of RAID you are adding as a logical disk, for example RAID 5 or RAID 0. The number of RAID types available varies depending on the number of drives included in the disk group.
   - Size—Enter the capacity of the disk you are adding as a logical disk. (Size must not exceed the indicated Maximum LUN size. The maximum size changes according to the RAID type selected.)
   - Name—(Optional) Enter a name (maximum 32 characters) for the new logical disk. If no name is specified, SAN Connection Manager uses the default name assigned by the subsystem.

The New Logical Disk Server Presentation dialog box (Figure 53) opens.

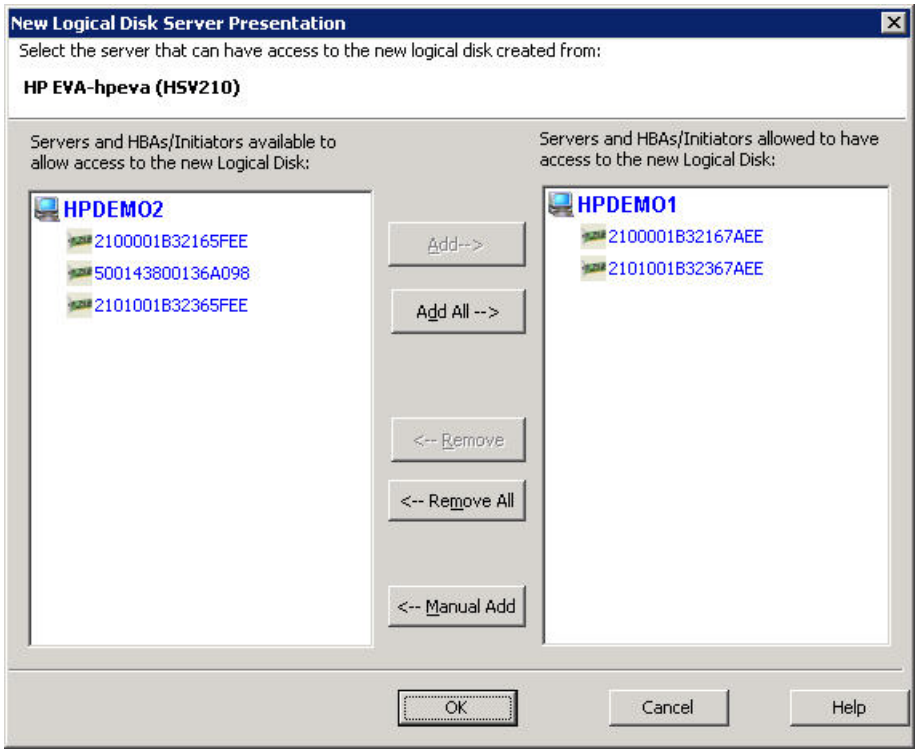

Figure 53 New Logical Disk Server Presentation dialog box (EVA storage)

The left column lists Servers and HBAs/Initiators available to allow access to the new Logical Disk, and the right column lists Servers and HBAs allowed to have access to the new Logical Disk.

NOTE: Colored text in the New Logical Disk Server Presentation dialog box has specific meanings; for example:

- The FC HBA name is blue if it has a physical connection to the logical disk subsystem.
- The FC HBA name is red if it has no physical connection to the logical disk subsystem.
- The server name is blue if all the HBAs have a connection.
- The server name is red if none of the HBAs have a connection.
- The server name is maroon if at least one HBA has a connection.

4. Determine which servers and HBAs/initiators on the available list in the left pane you want to have access to the new logical disk. Then click **Add** to move individual items to the allowed access list in the right pane. To move all items on the available list to the allowed access list, click **Add All**.

NOTE: If you add an HBA or server by mistake, select the HBA or server in the right-hand list and click **Remove**. To clear the allowed to have access list and start the selection again, click **Remove All**.

5. (Optional) To manually give an HBA access to the logical drive, complete the following steps:
   a. On the New Logical Disk Server Presentation dialog box (Figure 53), click **Manual Add**.
      The New HBA Port Names dialog box opens (Figure 54).

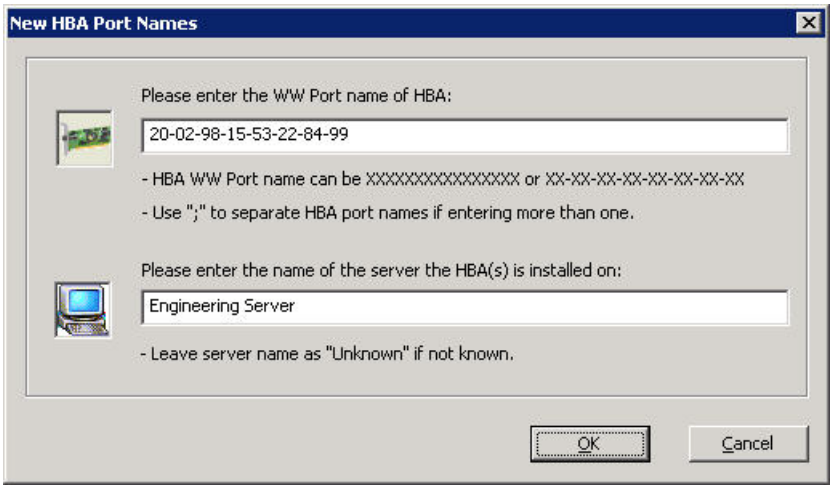

Figure 54 New HBA Port Names dialog box

   b. In the first box, enter the WWPN of the HBA. You can enter the HBA WWPN formatted as either 20 consecutive alphanumeric characters, or as 10 two-digit segments separated by hyphens; for example, xx-xx-xx-xx-xx-xx-xx-xx-xx-xx.
   c. In the second box, enter the name of the server on which the HBA(s) are installed. If you do not know the name of the server, enter **Unknown**.
   d. When you finish manually adding the HBA, click **OK** to save the information and close the dialog box. To close the dialog box without saving any data, click **Cancel**.
6. When you finish on the New Logical Disk Server Presentation dialog box, click **OK** to save your changes and close the dialog box.
   The Create New Logical Disk wizard (Figure 55) opens and lists the information for the new logical disk.

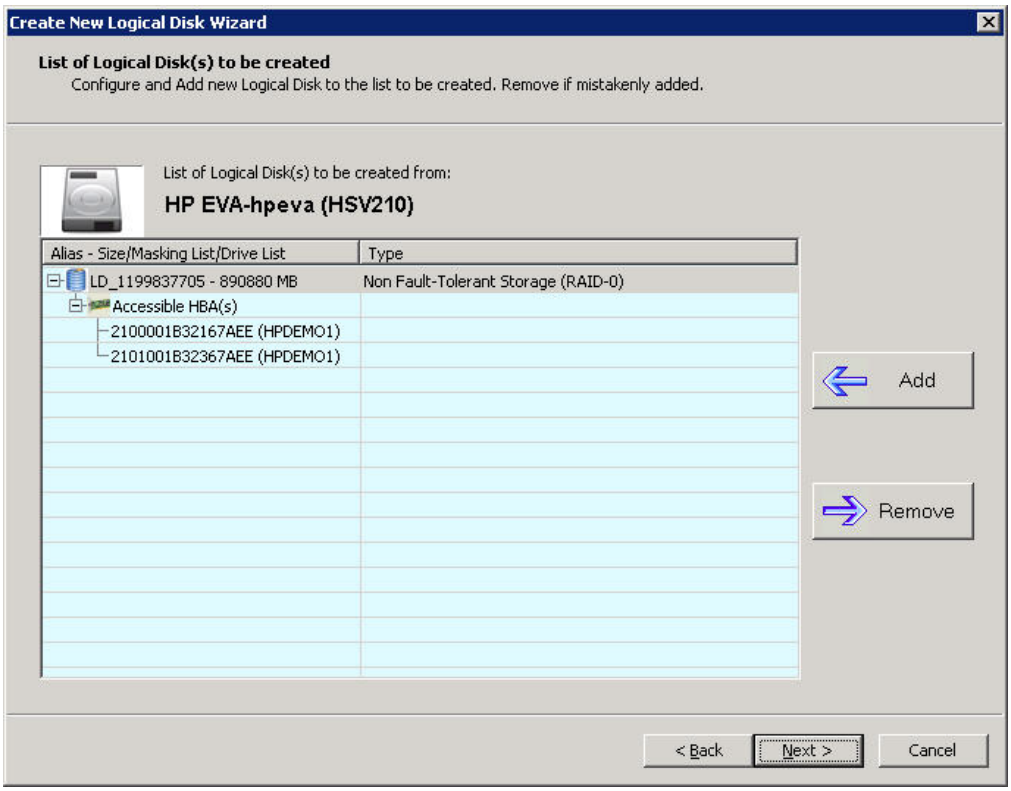

Figure 55 Create New Logical Disk Wizard (EVA storage)

7. To configure another new logical disk, click **Add**. To remove a logical disk from the list and prevent its creation, select the logical disk, and then click **Remove**.

> **NOTE:** SAN Connection Manager allows you to create multiple logical disks at once to both HP EVA and HP MSA 2000 family storage arrays. However, if you have HP MSA 1000/1500 storage arrays, you can create only one new logical disk at a time.

8. When you finish adding to the list of new logical disks, click **Next**.
9. To complete the logical disk creation, click **Finish**.

   The Create New Logical Disk wizard shows the progress of the logical disk creation, the results, and any error message from the subsystem if logical disk creation fails.
10. After the logical disk creation process is complete and you have reviewed all status and messages, click **Close**.

    If one of the newly-created LUNs is assigned to a Windows 2003 or Windows 2008 system using QLogic-based HBAs, the Create And Format Partitions From New/Existing Logical Disk dialog box opens (Figure 56).

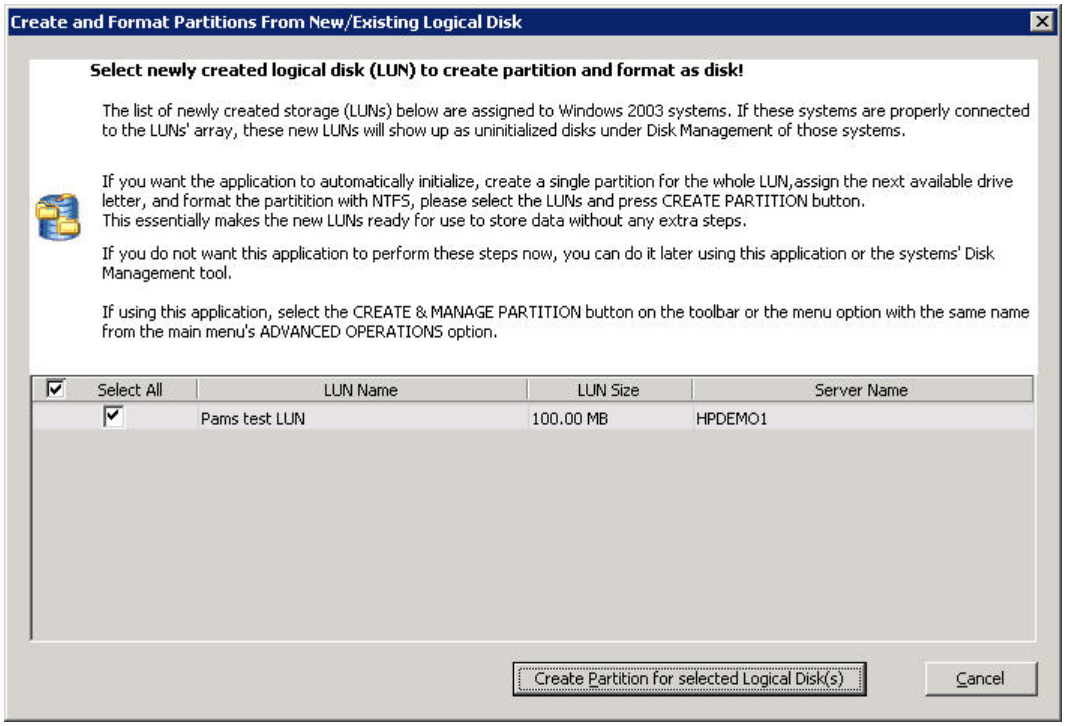

Figure 56 Create and Format Partitions From New/Existing Logical Disk dialog box

This dialog box shows the new LUN as an uninitialized disk on the server. It notes that SAN Connection Manager can initialize and format the disk for you.

11. Click the **Create Partition for selected Logical Disk(s)** button to begin this process. To create partitions later, click **Cancel**. (If you choose to create partitions later, see "Creating and managing partitions," page 105.)
12. A message box informs you that the partition creation may take a few minutes and advises you not to close the application. To close the message box and continue, click **OK**.

SAN Connection Manager automatically retrieves the updated configuration from the subsystem and refreshes the navigation pane and the topology maps in the content pane to include the new logical disk(s).

NOTE: If you present (assign) a logical disk to a Windows system, you can instead use the system's Disk Management option to create partitions and assign a drive letter or mount path on partitions.

1. To access Computer Management, choose one of the following options:
   - Open the Windows Control Panel, select **Administrative Tools**, and then select **Computer Management**.
   - On the Windows desktop, right-click the My Computer icon, and then click **Manage**.
2. In the Computer Management utility's left pane under Storage, click **Disk Management**.

Creating a logical disk—MSA storage

The Create New Logical Disk wizard assists with the creation of logical disks from the storage arrays (subsystems) in your SAN. Use the following procedure to create a logical disk from an HP MSA 1000/1500 or MSA 2000 family storage array. (If your storage array type is EVA, see "Creating a logical disk—EVA storage," page 84.)

IMPORTANT: Before you can create a logical disk as a RAID 3, 10, or 50 type on an MSA 2000 family storage array, you must first create a LUN of that same RAID type using the MSA 2000 family web management interface: SMU. For instructions, refer to your MSA 2000 family documentation. After you create the LUN with SMU, launch SAN Connection Manager. A storage pool with the RAID type you just created will be visible. Then you can follow the steps in this section to create additional LUNs of that RAID type.

IMPORTANT: The following limitations apply to LUN creation for the MSA 2000 family:

- A maximum of 16 virtual disks (disk groups) are allowed per controller.
- All LUNs on a virtual disk must be of the same RAID level.
- You cannot combine SAS and SATA drives in the same virtual disk.
- The minimum and maximum number of disk drives for each RAID level are as follows:

RAID Level	Minimum Drives	Maximum Drives
0	2	16
1	2	16
5	3	16
6	4	16

NOTE: The screens depicted in the figures in this section may appear slightly different on your system, depending on your MSA storage array type (1000/1500 or 2000 family).

To create a logical disk for MSA storage:

1. To access the Create New Logical Disk wizard, choose one of the following options:
   - On the Logical Disk Operations menu, click **Create New Logical Disk**.
   - In the navigation pane or in the content pane's topology map, right-click the subsystem icon to select a specific MSA subsystem from which to create a logical disk. Then on the shortcut menu, click **Create Logical Disk from Storage Subsystem**.

   The Create New Logical Disk wizard opens.

2. If no specific subsystem is selected and if there is more than one subsystem in the SAN, select from the subsystem list the MSA subsystem on which you want the logical disk(s) created, and then click **Next**.

   If this is the first logical disk created on the subsystem, the Create Storage Pool dialog box opens (Figure 57); continue with step 3. If not, the Select Storage Pool for Logical Disk Creation dialog box opens (Figure 58); continue with step 4.

3. If the Create Storage Pool dialog box (Figure 57) opens, follow these steps to create a storage pool:

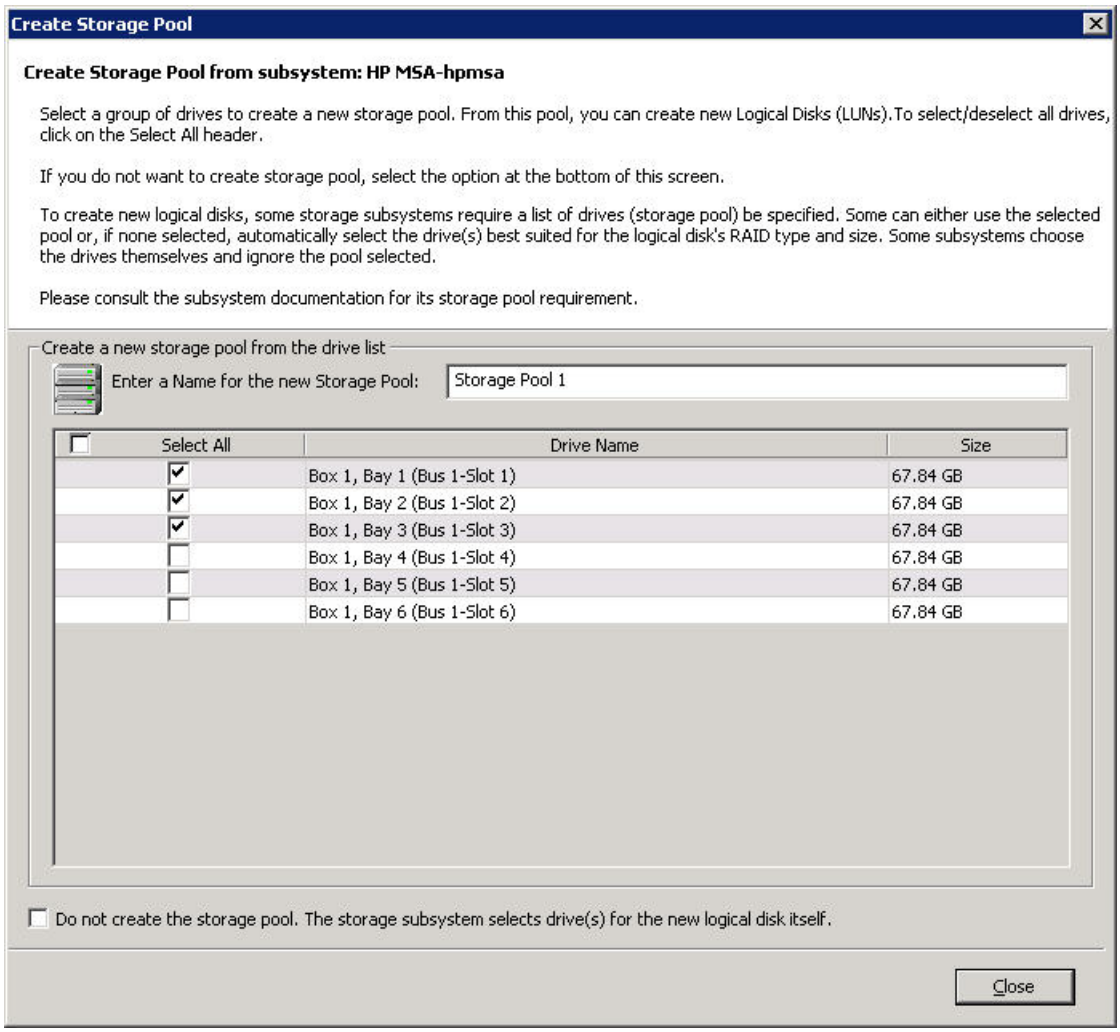

Figure 57 Create Storage Pool dialog box

   a. In the Enter a Name for the new Storage Pool box, enter the name of the new storage pool (the default name is *Storage Pool #*).

   b. Select the check boxes next to one or more Drive Names to be included in the pool, or select the **Select All** check box to include all drives in the pool. If you plan to create a logical disk with type RAID 5 (stripe with parity or fault-tolerant capacity optimized), select at least three drives in the pool. For RAID 1 (mirrored), select an even number of drives.

   By default, if the subsystem has fewer than five drives available for the new pool, all drives are automatically selected for inclusion in the storage pool. If the subsystem has more than four drives, the drives are not selected and you must select either all or individual check boxes to include the drives in the pool.

   c. If you want the storage subsystem to select the drives for the new logical disk, select the Do not create the storage pool... check box near the bottom of the dialog box.

   d. To close this dialog box and create the storage pool, click **Close**.

NOTE: To best utilize the space of all drives in the pool, make sure the sizes of all drives are the same. If the logical disk is striped across multiple drives, the subsystem might only use the size of the smallest drive and ignore the bigger space on other drives.

NOTE: If you choose to create a storage pool with fewer than three drives, a message box informs you that a pool with fewer than three drives does not support fault-tolerant capacity optimized (RAID 5) and asks if you want to continue. Click **Yes** to continue or **No** to return to the Create Storage Pool dialog box to change your selection.

e. Continue with step 6.

4. If the Select Storage Pool for Logical Disk Creation dialog box (Figure 58) opens, complete the following steps:

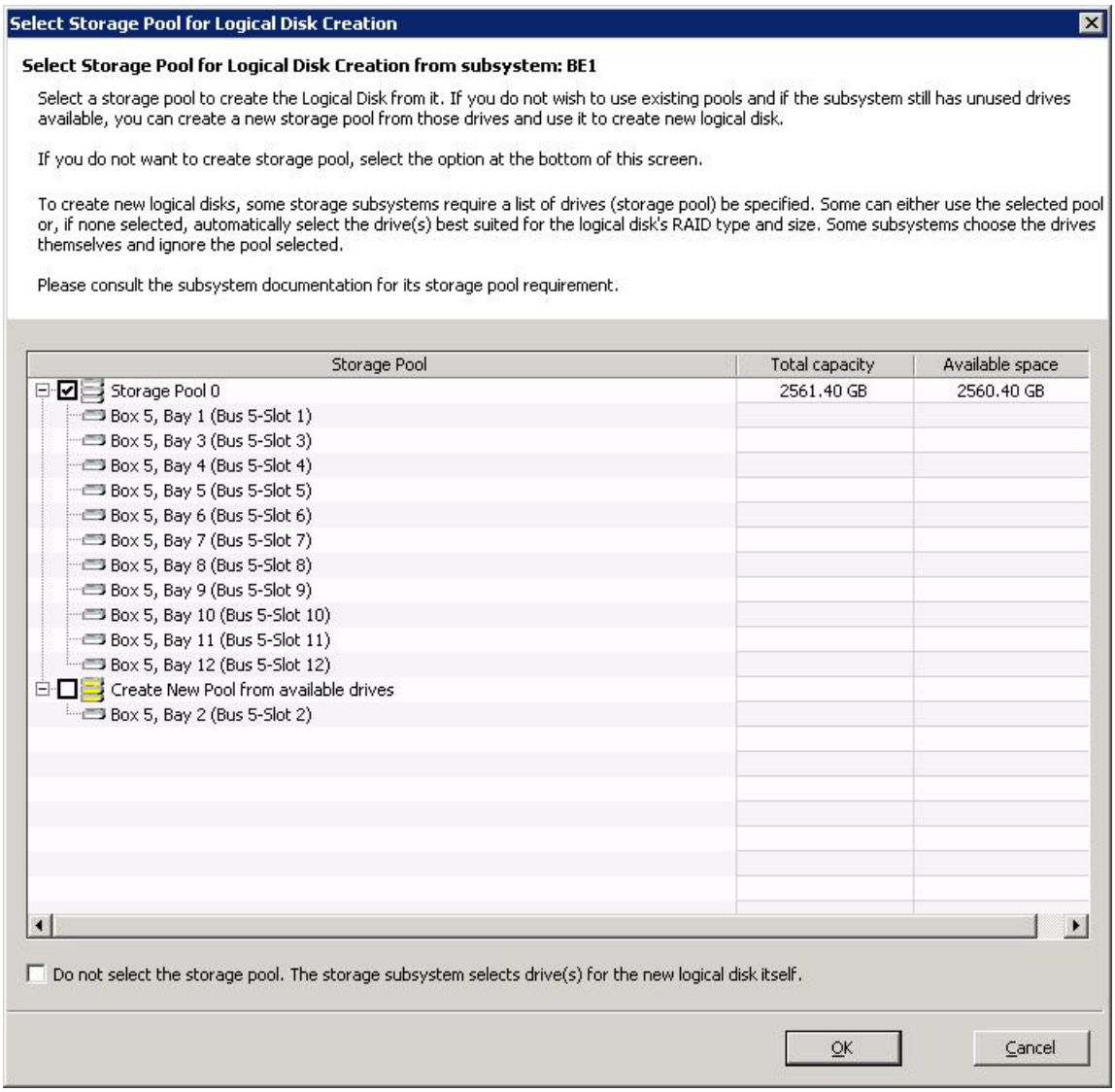

Figure 58 Select Storage Pool for Logical Disk Creation dialog box

a. Select one of the existing pool(s) that has space available for a new logical disk by selecting check box next to the Storage Pool name. (If the pool has no space available, the check box is not visible.)

b. If the subsystem has unused drives, you can select the **Create New Pool from available drives** check box to create another storage pool. If you select this check box, the Create Storage Pool dialog box opens (see step 3) when you click **OK**.

c. If you want the storage subsystem to select the drives for the new logical disk, select the **Do not create the storage pool**... check box near the bottom of the dialog box.

d. To close this dialog box and continue with logical disk creation, click **OK**. To close the dialog box without selecting a storage pool, click **Cancel**.

A message box asks if you want to assign unused drives as spares. If you click **Yes**, the Assign Spare Drive dialog box (Figure 59) opens; go to step 5. If you click **No**, go to step 6.

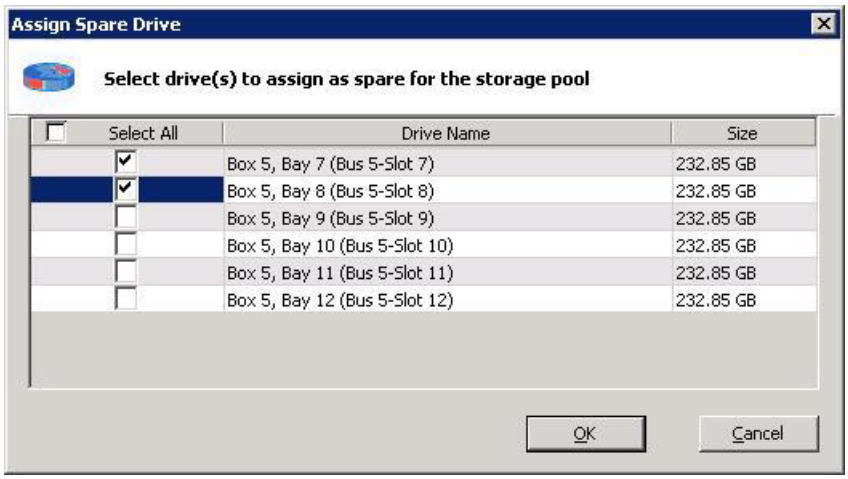

Figure 59 Assign Spare Drive dialog box

5. Select one or more check boxes corresponding to the Drive Names you want to use as spare drives for this storage pool, or select the **Select All** check box to use all drives. Then click **OK**.

   The New Logical Disk Parameters dialog box (Figure 60) opens.

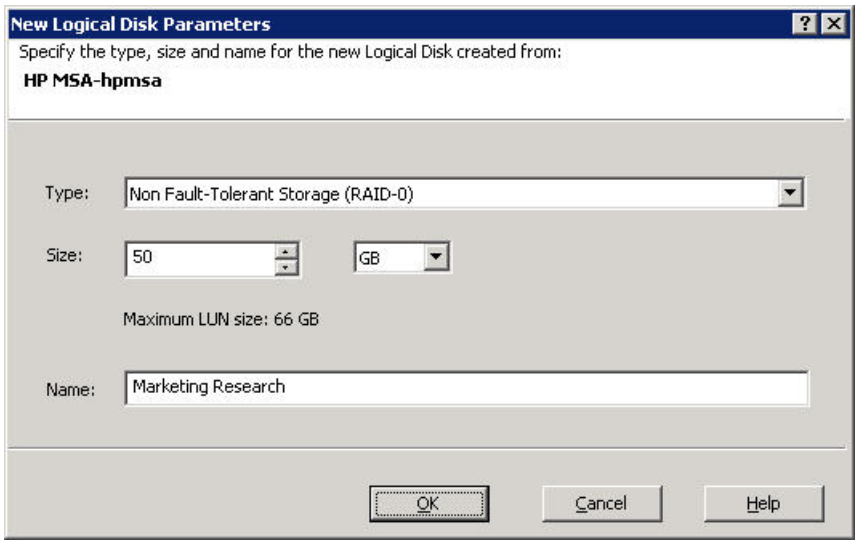

Figure 60 New Logical Disk Parameters dialog box (MSA storage)

6. Specify the following parameters, and then click **OK**:
   - Type—From the list, select the class of RAID you are adding as a logical disk; for example RAID 5 or RAID 0. The number of RAID types available varies depending on the number of drives included in the storage pool.
   - Size—Enter the capacity of the disk you are adding as a logical disk, and then select unit of capacity (GB or MB). (Size must not exceed the indicated Maximum LUN size. The maximum size changes according to the RAID type selected.)
   - Name—(Optional) Enter a name (maximum 32 characters) for the new logical disk. If no name is specified, SAN Connection Manager uses the default name assigned by the subsystem.

The New Logical Disk Server Presentation dialog box (Figure 61) opens.

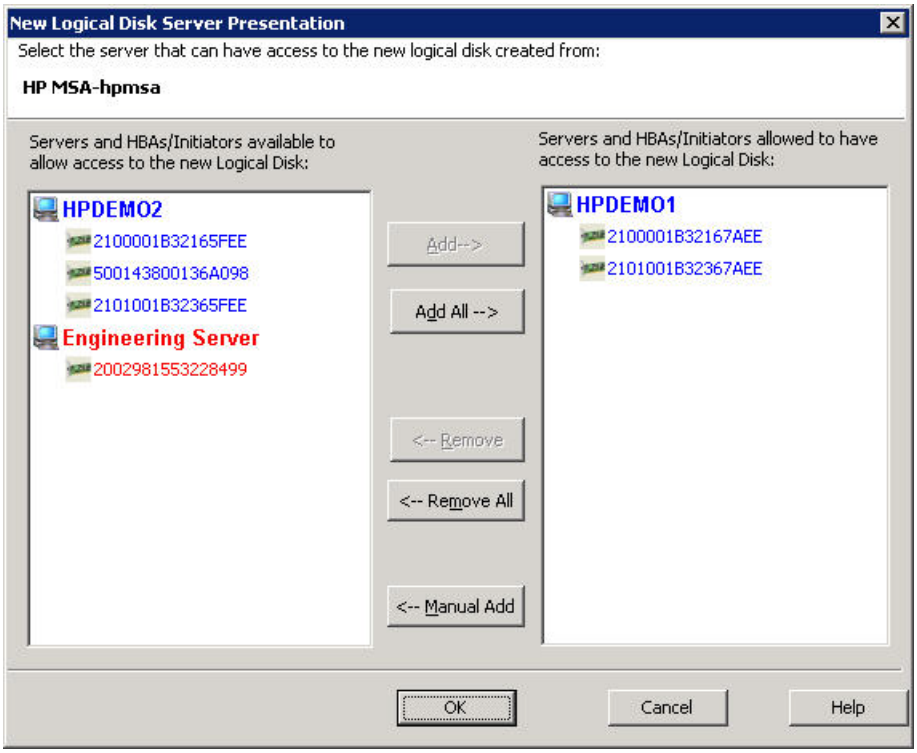

Figure 61 New Logical Disk Server Presentation dialog box (MSA storage)

The left column lists Servers and HBAs/Initiators available to allow access to the new Logical Disk, and the right column lists Servers and HBAs allowed to have access to the new Logical Disk.

NOTE: Colored text in the New Logical Disk Server Presentation dialog box has specific meanings, for example:

- The FC HBA name is blue if it has a physical connection to the logical disk subsystem.
- The FC HBA name is red if it has no physical connection to the logical disk subsystem.
- The server name is blue if all the HBAs have a connection.
- The server name is red if none of the HBAs have a connection.
- The server name is maroon if at least one HBA has a connection.

7. Determine the servers and HBAs/initiators on the available list on the left that you want to have access to the new logical disk. Then click the **Add** button to move individual items to the allowed access list on the right, or click **Add All** to move all items on the available list to the allowed access list.

NOTE: If you add an HBA or server by mistake, select the HBA or server from the right-hand list and click **Remove**. To clear the allowed to have access list and start the selection again, click **Remove All**.

8. (Optional) To manually give an HBA access to the logical drive:
   a. On the New Logical Disk Server Presentation dialog box, click **Manual Add**. The New HBA Port Names dialog box (Figure 62) opens.

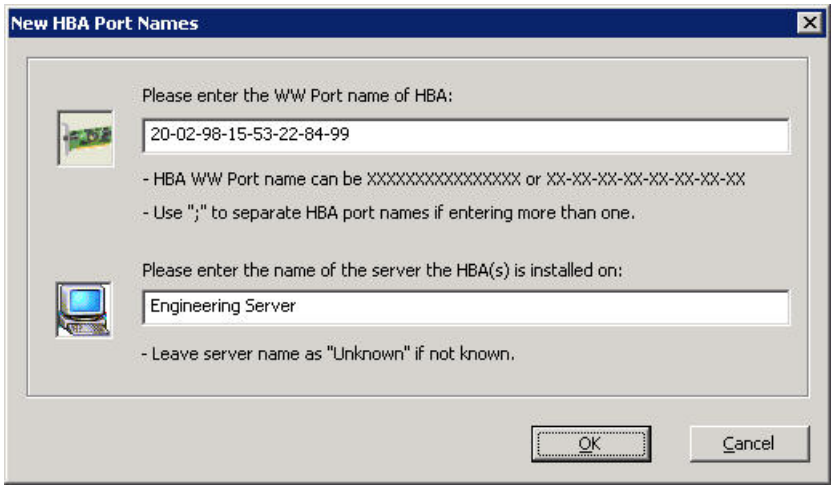

Figure 62 New HBA Port Names dialog box

   b. In the first box, enter the WWPN of the HBA. You can enter the HBA WWPN formatted as either 20 consecutive alphanumeric characters, or as 10 two-digit segments separated by hyphens; for example, `xx-xx-xx-xx-xx-xx-xx-xx-xx-xx`.
   c. In the second box, enter the name of the server on which the HBA(s) are installed. If you do not know the name of the server, enter **Unknown**.
   d. When you finish manually adding the HBA, click **OK** to save the information and close the dialog box. To close the dialog box without saving any data, click **Cancel**.
9. When you finish on the New Logical Disk Server Presentation dialog box, click **OK** to save your changes and close the dialog box.

   The Create New Logical Disk wizard (Figure 63) opens and lists the information for the new logical disk.

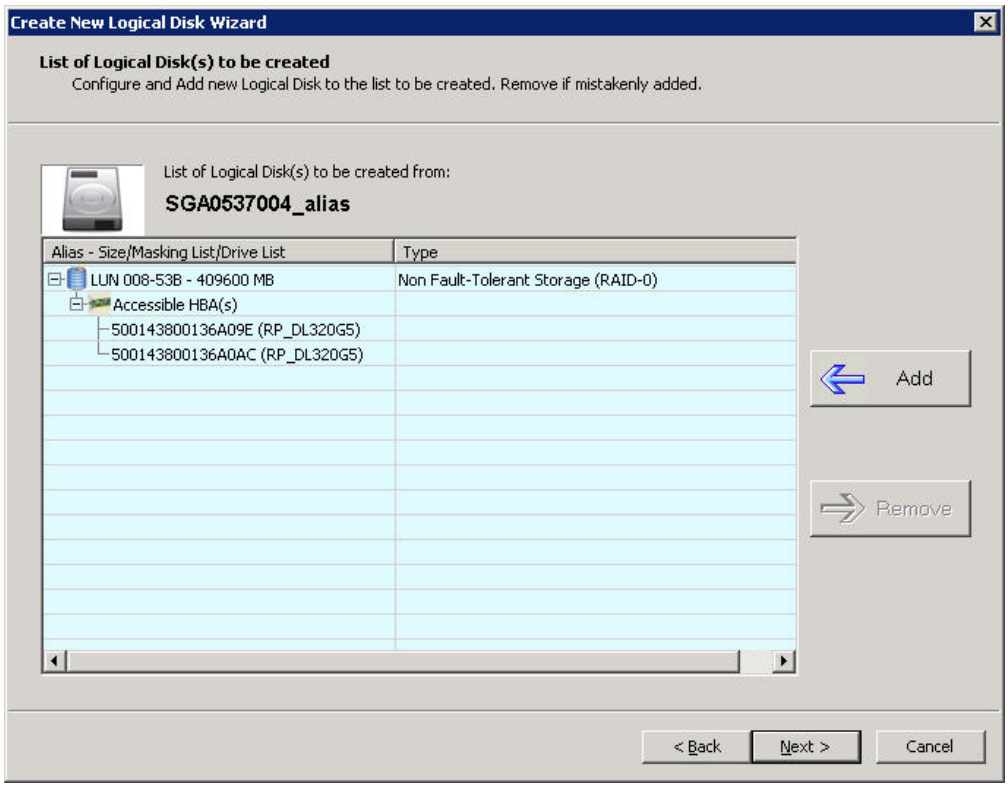

Figure 63 Create New Logical Disk Wizard (MSA storage)

10. To configure another new logical disk, click **Add**. To remove a logical disk from the list and prevent its creation, select the logical disk, and then click **Remove**.

> **NOTE:** SAN Connection Manager allows you to create multiple logical disks at once to both HP EVA and HP MSA 2000 family storage arrays. However, if you have HP MSA 1000/1500 storage arrays, you can create only one new logical disk at a time.

11. When you are satisfied with your settings for the new logical disk, click **Next**.
12. To complete the logical disk creation, click **Finish**.

    The Create New Logical Disk wizard shows the progress of the logical disk creation, the results, and any error message from the subsystem if logical disk creation fails. It may take several minutes to create a logical disk on MSA storage.
13. When you have finished creating the logical disk, and you have reviewed all status and messages, click **Close**.

    If one of the newly-created LUNs is assigned to a Windows 2003 or Windows 2008 system using QLogic-based HBAs, the Create And Format Partitions From New/Existing Logical Disk dialog box opens (Figure 64).

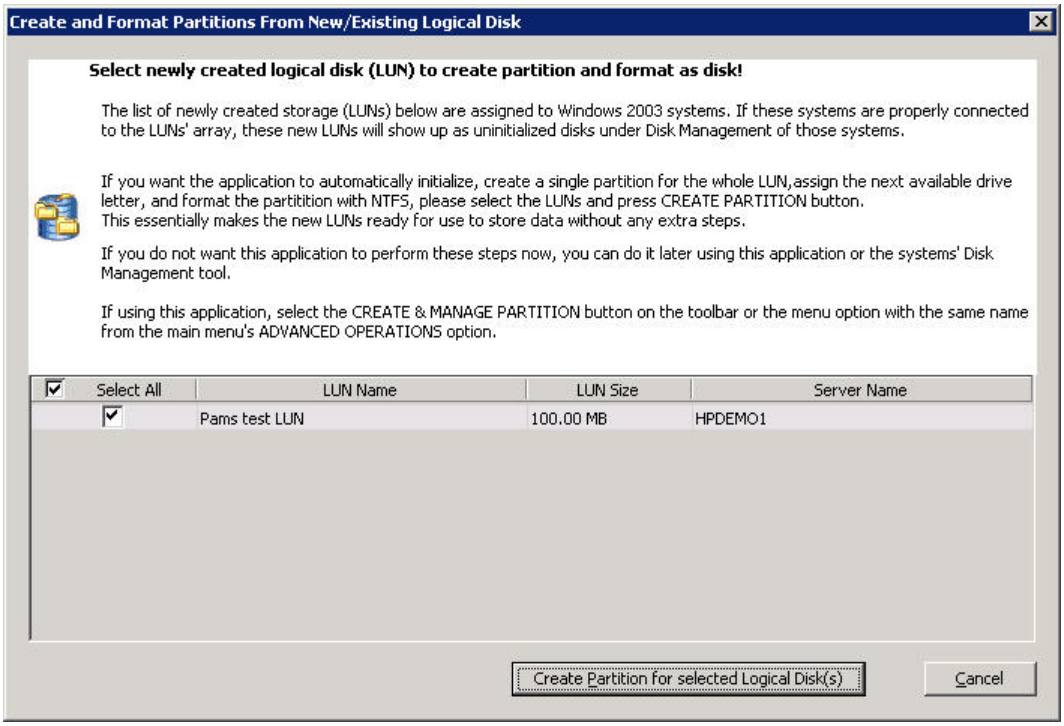

Figure 64 Create and Format Partitions From New/Existing Logical Disk dialog box

    This dialog box shows the new LUN as an uninitialized disk on the server. It notes that SAN Connection Manager can initialize and format the disk for you.
14. Click the **Create Partition for selected Logical Disk(s)** button to begin this process. To create partitions later, click **Cancel**. (If you choose to create partitions later, see "Creating and managing partitions," page 105.)
15. A message box informs you that the partition creation may take a few minutes and advises you not to close the application. To close the message box and continue, click **OK**.

SAN Connection Manager automatically retrieves the updated configuration from the subsystem and refreshes the navigation pane and the topology maps in the content pane to include the new logical disk(s).

NOTE: If you present (assign) a logical disk to a Windows system, you can instead use the system's Disk Management option to create partitions and assign a drive letter or mount path on partitions.

1. To access Computer Management, choose one of the following options:
   - Open the Windows Control Panel, select **Administrative Tools**, and then select **Computer Management**.
   - On the Windows desktop, right-click the My Computer icon, and then click **Manage**.
2. In the Computer Management utility's left pane under Storage, click **Disk Management**.

Assigning and unassigning a logical disk to a server

SAN Connection Manager provides the capability for assigning or unassigning logical disks to servers within your SAN. When a logical disk (LUN) is assigned to an HBA or server for access, that LUN is unmasked to that HBA or server. When the HBA or server does not have access to the logical disk (LUN), the LUN is masked from the HBA or server. LUN assignment is also referred to as *LUN masking*.

To assign a logical disk to a server:

1. To access the Logical Disk Server Presentation dialog box, choose one of the following options:
   - On the Logical Disk Operations menu, click **Present (Un-present) Logical Disk to Server**.
   - In the navigation pane (or in the content pane on the LUN Assignment map), right-click the LUN icon. Then on the shortcut menu, click **Assign Logical Disk to Server**.

   The Logical Disk Server Presentation dialog box (Figure 65) opens.

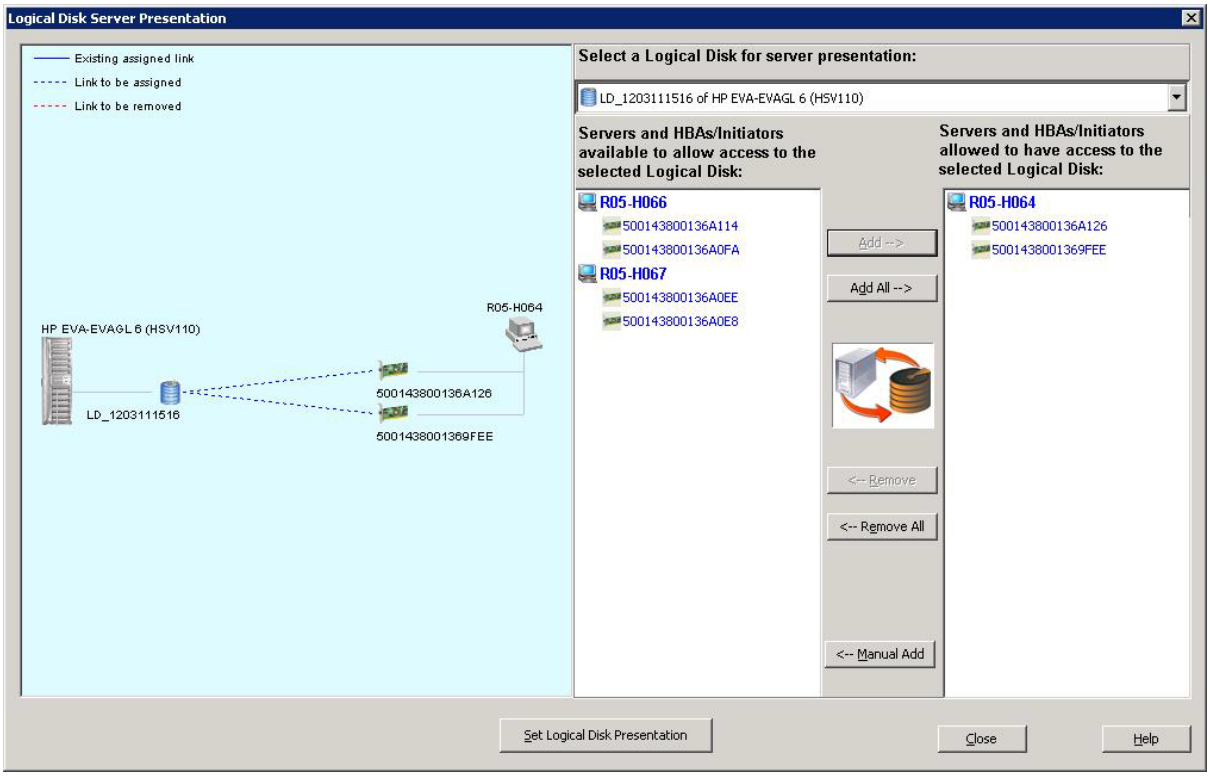

Figure 65 Logical Disk Server Presentation dialog box

2. From the Select Logical Disk for server presentation list, click the logical disk you want to assign/unassign access to selected HBAs and servers.

3. To grant access, do one of the following:
   - To allow access to all HBAs within a server, select the server in the Servers and HBAs/Initiators available to allow access to the selected Logical Disk list, and then click **Add**.
   - To allow access to individual HBAs, select each HBA in the Servers and HBAs/Initiators available to allow access to the selected Logical Disk list, and then click **Add**.
   - To allow access to all of the HBAs and servers shown in the Servers and HBAs/Initiators available to allow access to the selected Logical Disk list, click **Add All**.

   The HBAs and servers selected to grant access are listed under Servers and HBAs/Initiators allowed to have access to the selected Logical Disk.
4. To deny access, do one of the following:
   - To disallow access to all HBAs within a server, select the server in the Servers and HBAs/Initiators allowed to have access to the selected Logical Disk list, and then click **Remove**.
   - To disallow access to individual HBAs, select each HBA in the Servers and HBAs/Initiators allowed to have access to the selected Logical Disk list, and then click **Remove**.
   - To disallow access to all of the HBAs and servers shown in the Servers and HBAs/Initiators allowed to have access to the selected Logical Disk list, click **Remove All**.

   NOTE: If a server is designated as an Unknown Server, you may be unable to deny access to that HBA or server (that is, you cannot remove it from the *allowed* list). For more information, see the Unknown Server problem section in "Troubleshooting," page 143.

   The updated list of HBAs and servers allowed to have access to the LUN is listed under Servers and HBAs/Initiators allowed to have access to the selected Logical Disk.
5. (Optional) To manually give an HBA access to the logical drive:
   a. On the Logical Disk Server Presentation dialog box, click **Manual Add**. The New HBA Port Names dialog box opens; see Figure 54 (for EVA storage) or Figure 62 (for MSA storage).
   b. In the first box, enter the WWPN of the HBA. You can enter the HBA WWPN formatted as either 20 consecutive alphanumeric characters, or as 10 two-digit segments separated by hyphens; for example, `xx-xx-xx-xx-xx-xx-xx-xx-xx-xx`.
   c. In the second box, enter the name of the server on which the HBA(s) are installed. If you do not know the name of the server, enter **Unknown**.
   d. When you finish manually adding the HBA, click **OK** to save the information and close the dialog box. To close the dialog box without saving any data, click **Cancel**.

   NOTE: A map on the left side of the dialog box presents a graphical representation of access assignments. HBAs that currently have access to the LUN (access is granted, as in step 3) are designated with a solid blue line drawn between the HBA and the LUN. If this access is removed (access is denied, as in step 4), the line is dotted red. If the HBAs currently have no access to the LUN and access is granted, the line is dotted blue.
6. Click **Set Logical Disk Presentation**.
7. Click **Close**.

NOTE: If you present (assign) a logical disk to a Windows system, you can instead use the system's Disk Management option to create partitions and assign a drive letter or mount path on partitions.

1. To access Computer Management, choose one of the following options:
   - Open the Windows Control Panel, select **Administrative Tools**, and then select **Computer Management**.
   - On the Windows desktop, right-click the My Computer icon, and then click **Manage**.
2. In the Computer Management utility's left pane under Storage, click **Disk Management**.

Expanding a logical disk

SAN Connection Manager enables you to easily increase the size of logical disks within your SAN.

To expand a logical disk:

1. To access the Expand Logical Disk dialog box, choose one of the following options:
   - On the Logical Disk Operations menu, click **Expand Logical Disk**.
   - In the navigation pane or the content pane's LUN Assignment map, right-click the logical disk icon, and then on the shortcut menu, click **Expand Logical Disk**.

   The Expand Logical Disk dialog box (Figure 66) opens.

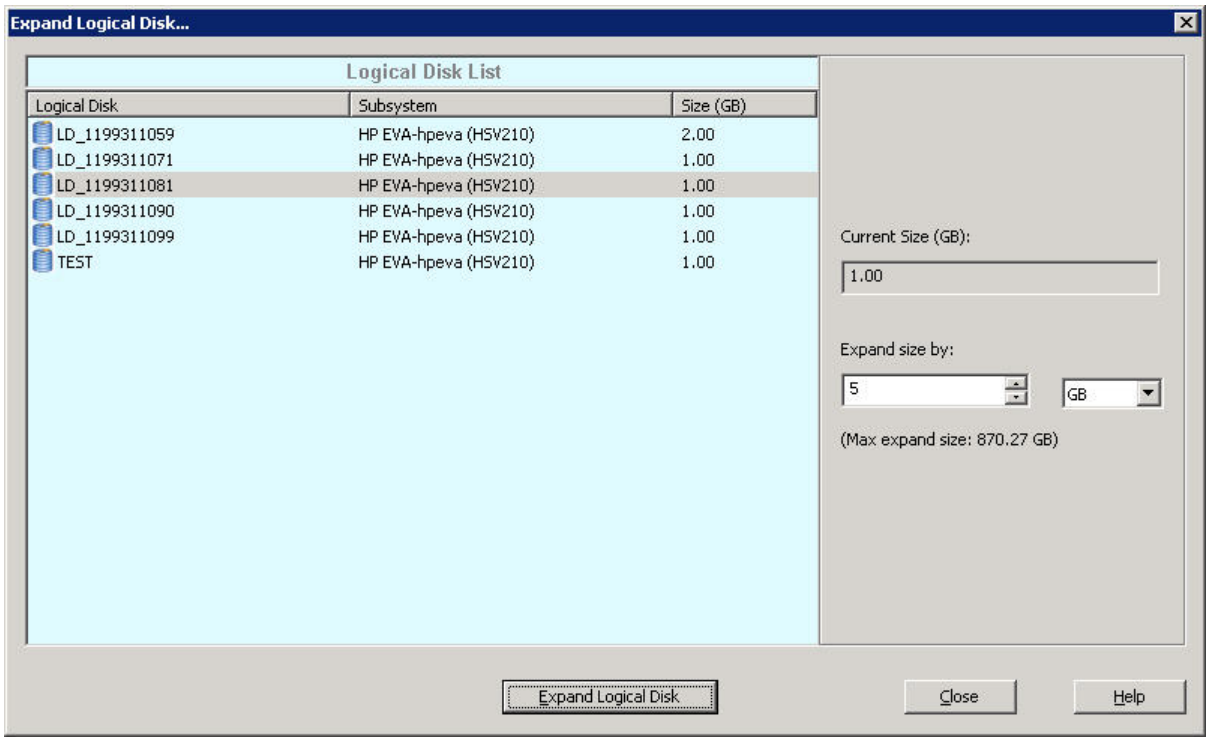

Figure 66 Expand Logical Disk dialog box

2. If more than one logical disk is listed, select the logical disk you want to expand from the list.

   The Current Size (GB) text box shows the selected logical disk's size.
3. In the Expand size by box, enter the amount to expand the logical disk either by clicking the up arrow or typing the number.
4. For logical disks in an MSA storage subsystem, choose the size unit by selecting either **MB** or **GB** from the list. (For logical disks in an EVA storage subsystem, only the GB size unit is available.)

NOTE: The expand functionality is not supported on remote servers running Linux.

5. Click **Expand Logical Disk**.
6. To expand additional logical disks, repeat steps 2 through 5.

NOTE: For some storage subsystems, the logical disk expansion request returns immediately; however the actual expansion process takes much longer to complete. While the expansion is in progress, the subsystem rejects any new request to expand the logical disk. To determine if the expanded logical disk status is rebuilding, click the **Refresh the Storage Subsystem** command on the Advanced Operations menu.

7. When you are finished expanding logical disks, click **Close**.

NOTE: Logical disk (LUN) expansion is a direct request to the subsystem to expand the logical disk size using unused space. The servers that have access to this logical disk might not recognize the new space for the disk until the server is rebooted or some software is invoked to discover the new size. In Windows, for example, you can use the Diskpart command-line utility to extend the volume to the newly-added space. In Linux, you can use the `lvextend` command to extend the size of a logical volume.

Deleting a logical disk

SAN Connection Manager provides an easy way to delete logical disks from your SAN.

To delete a logical disk:

1. On the Logical Disk Operations menu, click **Delete Logical Disk**.
   The Delete Logical Disk dialog box (Figure 67) opens.

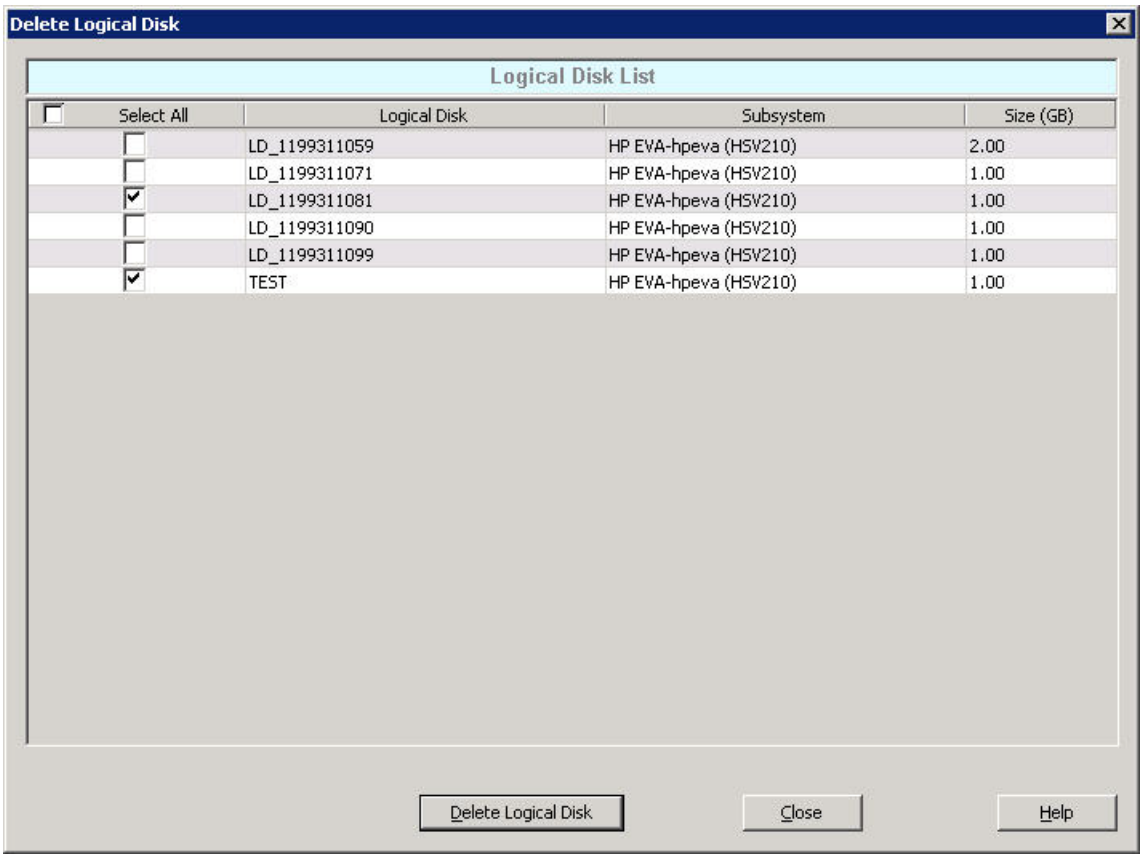

Figure 67 Delete Logical Disk dialog box

2. From the Logical Disk List, select the check box next to the logical disk(s) you want to delete. (To delete all logical disks, select the **Select All** check box.)

   NOTE: For HP MSA 1000/1500 subsystems, you can delete only the logical disk at the bottom of the list.

3. Click **Delete Logical Disk**.
4. To confirm the deletion, click **Yes**.
5. Repeat steps 2 through 4 to delete additional logical disks.
6. When you are finished deleting logical disks, click **Close**.

Creating an alias for a logical disk

You can create alias (user-friendly) names for logical disks (LUNs) to help you easily identify them in SAN Connection Manager.

To create an alias for a logical disk:

1. On the LUN Assignment map, right-click a logical disk (LUN) icon, and then on the shortcut menu, click **Create Alias for Logical Disk**.

   The Create Alias for Logical Disk dialog box (Figure 68) shows the logical disk name and identifier.

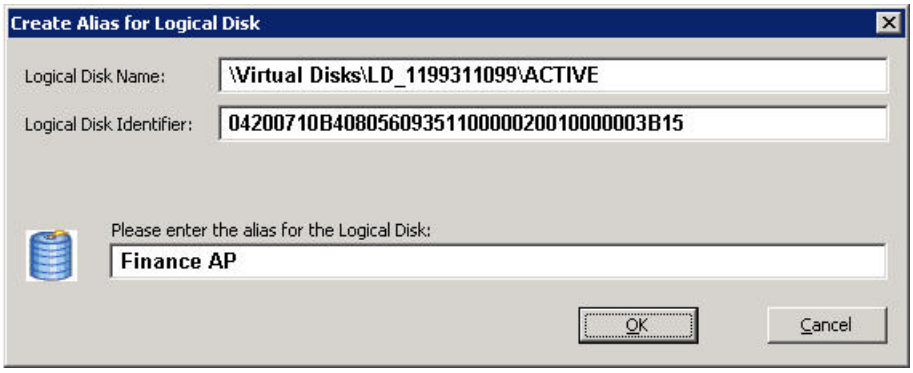

Figure 68 Create Alias for Logical Disk dialog box

2. Enter an alias name to replace the logical disk name, and then click **OK**.

   The LUN Assignment map is updated with the new logical disk alias name.

8 Managing Servers

This chapter provides procedures for viewing and managing your servers using SAN Connection Manager.

Viewing server information

SAN Connection Manager provides easy access to information about each server within your SAN, as well as details about the drives, logical disks, and volumes on the servers.

To view information about a server:

- In the navigation pane under Server-Storage View, click the server you want to view.
  The content pane (Figure 69) shows information for the selected server.

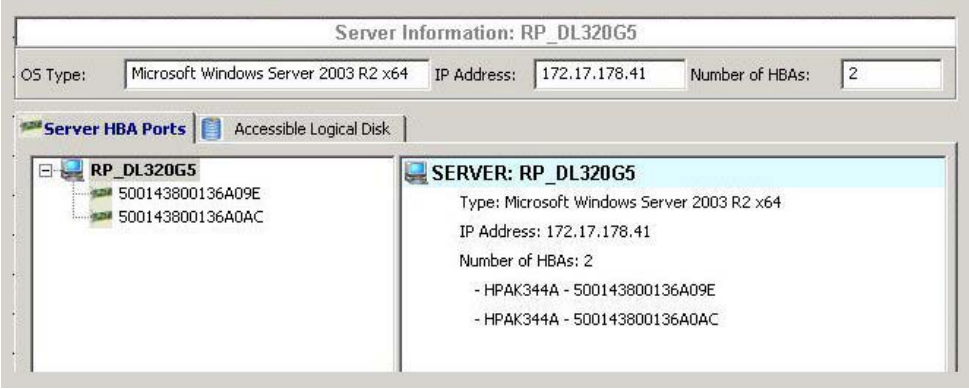

Figure 69 Server Information

This pane includes the following read-only information:

- Server Information header:
  - OS Type
  - IP Address
  - Number of HBAs
- Server HBA Ports tab:
  - Model
  - Node Name
  - Serial Number
  - Firmware Version
  - BIOS Version
  - Driver Version
  - HBA Status
  - Number of Connected Targets
- Server Accessible Logical Disk tab:
  - Device Type
  - Vendor ID
  - Product ID
  - Product Revision
  - Serial Number
  - Bus Type
  - Rebuild Priority
  - LUNs Active Controller(s)
  - LUN Flags

To view details about the drives, logical disks, and volumes on a server:

1. In the navigation pane under Server-Storage View, select the server for which you want to view details.
2. Under [Logical Disk/Volume List], select a logical disk, and then click a drive letter.
   The content pane provides the details for the selected drive; Figure 70 shows an example.

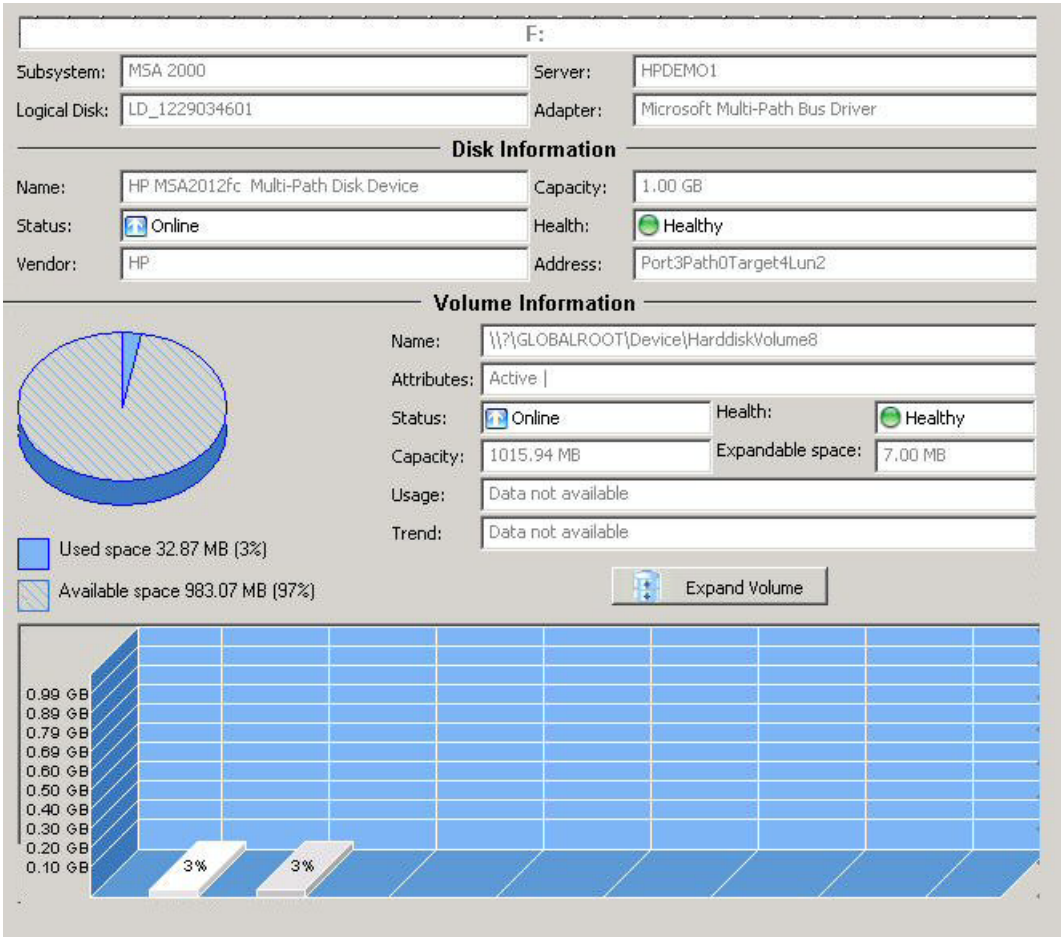

Figure 70 Drive, disk, and volume information

The data is organized into sections for general, disk, and volume information as follows:

- The top section, under the drive letter, provides the subsystem name, logical disk (LUN) name, server name, and the adapter through which the volume is accessed.
- The Disk Information section provides details about the disk to which the volume belongs (a disk may have multiple volumes), including:
  - Disk name
  - Status (for example, Online or Offline)
  - Vendor name (HP)
  - Capacity
  - Health (for example, Healthy)
  - Disk address that appears in the Windows Device Manager or the Drive Details dialog box (see Figure 96 on page 124).
- The Volume Information section provides the following details for the volume:
  - A pie chart shows the volume's used and available space (similar to the Windows volume details).
  - Name indicates the volume name (not drive letter); this name is used by SAN Connection Manager to open and close this volume.
  - Attributes may include Active, Read-only, Boot, System, and so on.
  - Status (for example, Online or Offline).

- Health (for example, Healthy)
- Capacity is the volume size.
- Expandable space, if any, is the size of unallocated space on the disk that the volume can grow without the need to first expand the LUN.
- Usage is the daily average usage; that is, the amount of space used daily from the data collected by SAN Connection Manager when it is launched.
- Trend specifies the usage trend; that is, the number of days projected to fill up the volume's remaining space based on the daily average usage.
- A bar graph shows the volume usage from the data collected by SAN Connection Manager every time is launched. SAN Connection Manager tracks only the last ten data points.
- The Expand Volume button opens a dialog box to extend the volume size. This button is grayed-out if the currently-selected volume is not the last volume (the last partition on the LUN).

3. (Optional) If the disk is getting full, click the **Expand Volume** button to either select the disk's existing extensible space, or to first expand the LUN and then use that new space.

   The Extending volume size dialog box opens (Figure 71).

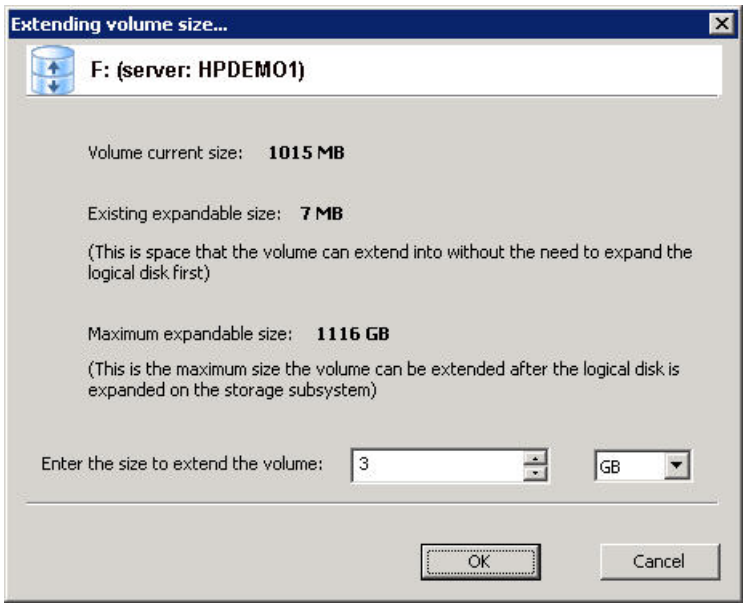

Figure 71 Extending volume size dialog box

4. Select a value by which to expand the volume size, and the unit of measurement (GB or MB).
5. Click **OK** to expand the volume by the specified value. Or, click **Cancel** to close this dialog box without expanding the volume.

   A message box confirms successful completion of the volume expansion.

Refreshing the server list

SAN Connection Manager provides server list management with the ability to quickly refresh the server list comprising your SAN. When you refresh the server list, the most current topology of your SAN is shown in the Physical Connection and LUN Assignment maps.

To refresh servers:

1. On the Advanced Operations menu, click **Refresh the Server List**.

   A message box informs you that SAN Connection Manager will delete all server and HBA data and rebuild the list, advises you that the process may take a while, and asks if you want to continue.
2. To continue with server and HBA discovery as if launching SAN Connection Manager for the first time, click **Yes**. To cancel this request, click **No**.

SAN Connection Manager updates the navigation pane (left pane) and the topology maps in the content pane (right pane) to reflect the addition and removal of servers.

Setting a server agent password

SAN Connection Manager provides a quick and easy way to set server agent passwords within your SAN. These passwords are required to update the HP PCIe FC HBA BIOS and driver.

NOTE: This feature is not supported with Emulex-based HBAs.

To set a server agent password:

1. To access the Set New Password for Server dialog box, choose one of the following options:
   - On the Adapter & Switch Management menu, click **Set Server Agent Password**.
   - In the content pane's topology map, right-click the server icon to select a specific server, and then on the shortcut menu, click **Set Server Agent Password**.

   The Set New Password for Server dialog box (Figure 72) opens.

Figure 72 Set New Password for Server dialog box

2. If you did not select a specific server for password change, click one from the list at the top of the dialog box. If you did select a server, that server's name appears grayed out.
3. Under Host Access, enter the following:
   - The server's User Login Name (the administrator or administrator-level login name of the server).
   - The server's Password for the login name.
4. Under Agent Access, enter the following:
   - The host agent's current password in the Old Password box. The default agent access password is *config*.
   - A new password in the New Password box.
   - Re-enter the new password in the Verify Password box.
5. To save your password changes and close this dialog box, click **OK**. To abandon password changes, click **Cancel**.

Creating and managing partitions

SAN Connection Manager can automatically initialize and create a partition on a newly-created LUN. Or, you can use the Create & Manage Partitions dialog box to manually create and manage partitions within your SAN. For detailed procedures, refer to the following sections:

- "Automatically creating a partition on a new LUN," page 105
- "Manually creating a partition," page 106
- "Managing a partition," page 110

NOTE: SAN Connection Manager can create and manage partitions only on Windows servers using QLogic-based HBAs.

Automatically creating a partition on a new LUN

For a newly-created logical disk, SAN Connection Manager provides the option to automatically initialize the LUN, create a single partition for the whole LUN, assign the next available drive letter, and format the partition with NTFS.

To automatically initialize, partition, and format a new LUN:

1. Add a logical disk using the Create New Logical Disk wizard; see "Creating a logical disk—EVA storage," page 84 or "Creating a logical disk—MSA storage," page 88.
   The Create and Format Partitions From New/Existing Logical Disk dialog box opens (Figure 73).

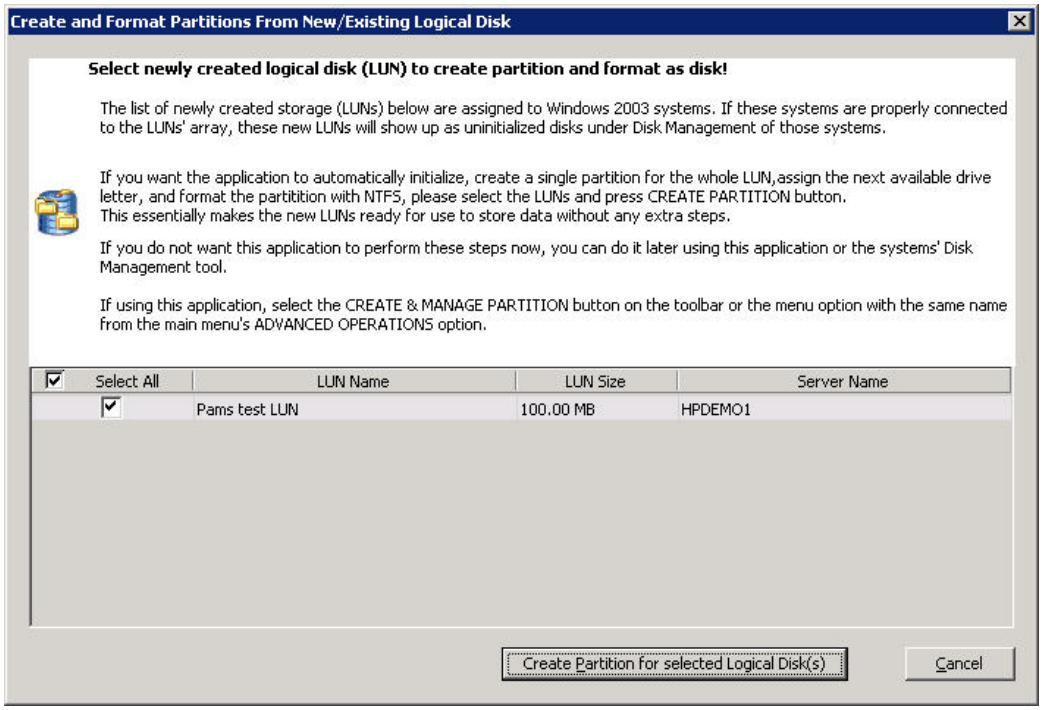

Figure 73 Create and Format Partitions From New/Existing Logical Disk dialog box

2. Select one or more newly-created logical disks by selecting the check box next to the LUN Name. To select all listed LUNs, select the **Select All** check box.
3. Click **Create Partition for selected Logical Disk(s)**.The following message box opens; see Figure 74.

Figure 74 Ready to create disk partition message box

4. To create the disk partition, click **OK**.

   SAN Connection Manager initializes the LUN, creates a single partition for the entire LUN, assigns the next available drive letter, and formats the partition with NTFS.

Manually creating a partition

Use the Create & Manage Partitions dialog box to:

- Add a new partition
- Initialize a new partition
- Assign a drive letter or path to a new partition

To create a partition from an existing logical disk:

1. On the Advanced Operations menu, click **Create & Manage Partition**.

   If there is more than one Windows 2003/2008 Server with assigned LUNs, the Server Selection for Partition Management window opens. If there is only one server with assigned LUNs, SAN Connection Manager automatically selects that server.
2. If the Server Selection for Partition Management window opens, select the server on which you want to create the partition, and then click **OK**.

   SAN Connection Manager searches the selected server for new and existing disks. These disks are LUNs that have been created on the storage subsystems and unmasked (assigned) to the server.

   The Create & Manage Partitions dialog box opens; see Figure 75. This dialog box shows the LUNs and associated disks on the top part and the map of disks and its partition(s) on the bottom. From the disk/partition map, you can initialize new disks, add new partitions, modify or delete existing partitions, and retrieve properties of the disk and partition.

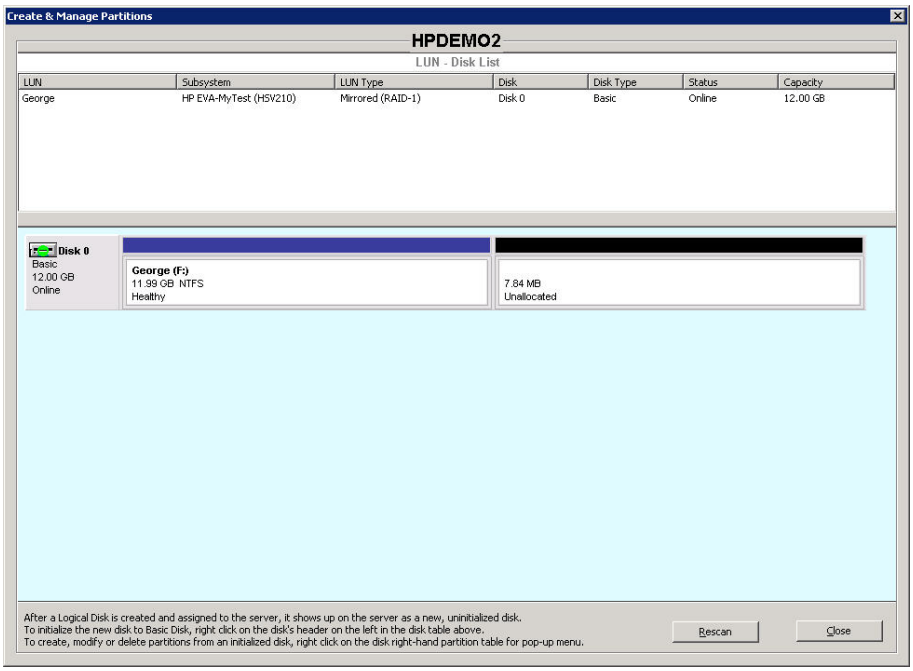

Figure 75 Create & Manage Partitions dialog box

3. To initialize a new disk so that it becomes a basic disk ready for partitioning and file mounting, right-click the disk header (the left most block of the disk) and on the shortcut menu, click **Initialize Disk**.
4. To add new partitions from an initialized disk, right-click the **Unallocated** section in the body of the disk, and on the shortcut menu, click **New Partition**.

   The Create New Partition wizard appears.

5. To begin partition creation, click **Next**.
   The wizard prompts you to specify the partition size; see Figure 76.

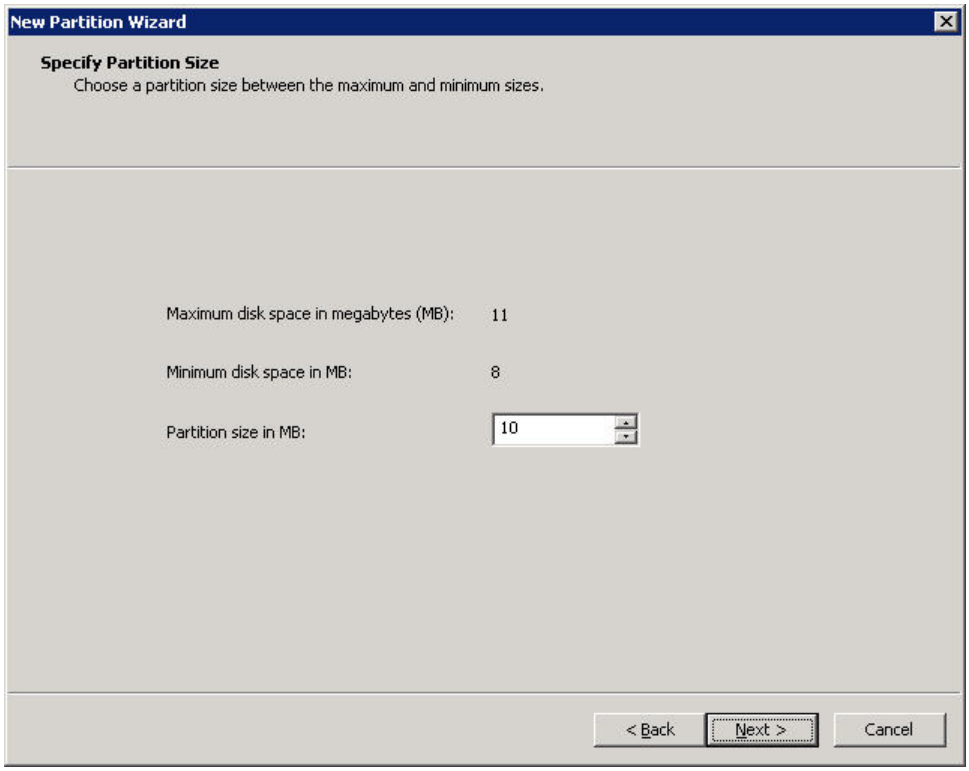

Figure 76 Create New Partition wizard: specifying partition size

6. Under Specify Partition Size, enter the **Partition size in MB** either by clicking the up or down arrows, or typing the number. Ensure that the size is between the minimum and maximum allowable values. Then click **Next**.
   The wizard prompts you to assign a drive letter or path.

7. Under Assign Drive Letter or Path, select one of the following options to assign a drive letter or drive path to the new partition, and then click **Next**:
   - Click **Assign the following drive letter** to select from the available drive letters on the system.
   - Click **Mount in the following empty NTFS** folder, and click **Browse** to navigate to the folder.
   - Click **Do not assign a drive letter or a drive path**.

   The wizard prompts you to select a format for the partition; see Figure 77.

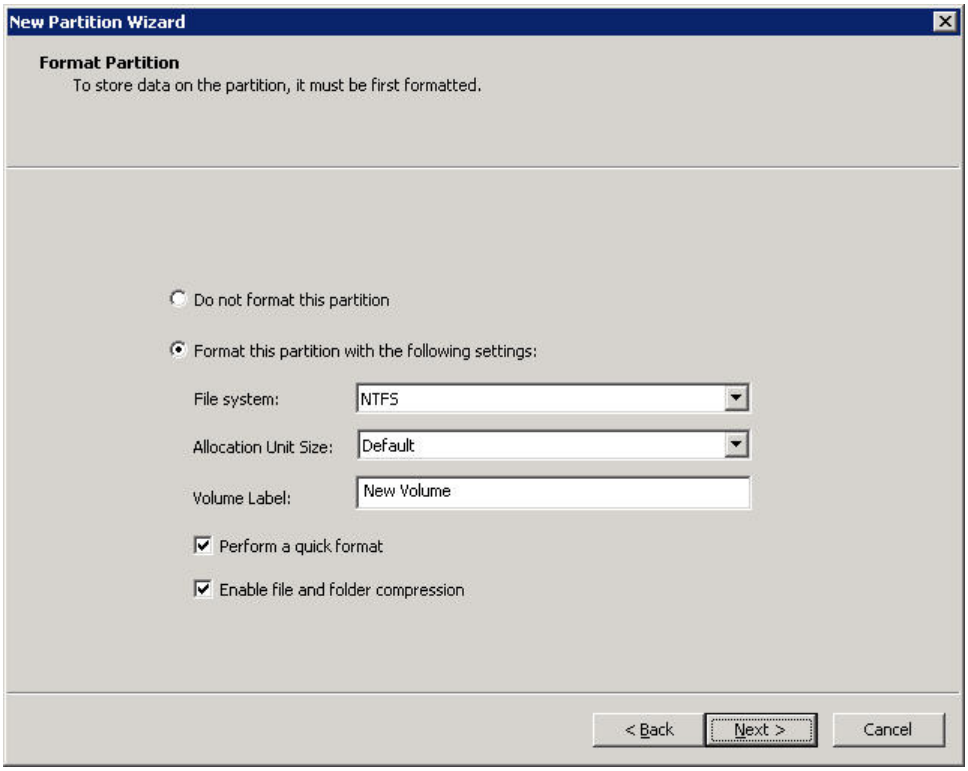

Figure 77 Create New Partition wizard: formatting partition

8. Under Format Partition, select one of the following options to format the new partition, and then click **Next**:
   - **Do not format the partition**.
   - **Format this partition with the following settings**.
     If you want to format the partition, complete the following:
     - **File System:** Select a file system from the drop-down list.
     - **Allocation Unit Size:** Select a size from the drop-down list.
     - **Volume Label:** Type a label in the text box.
     - **Perform a quick format:** Select to enable this option.
     - **Enable file and folder compression:** Select to enable this option.

   The final wizard window shows the partition settings you have selected; see Figure 78.

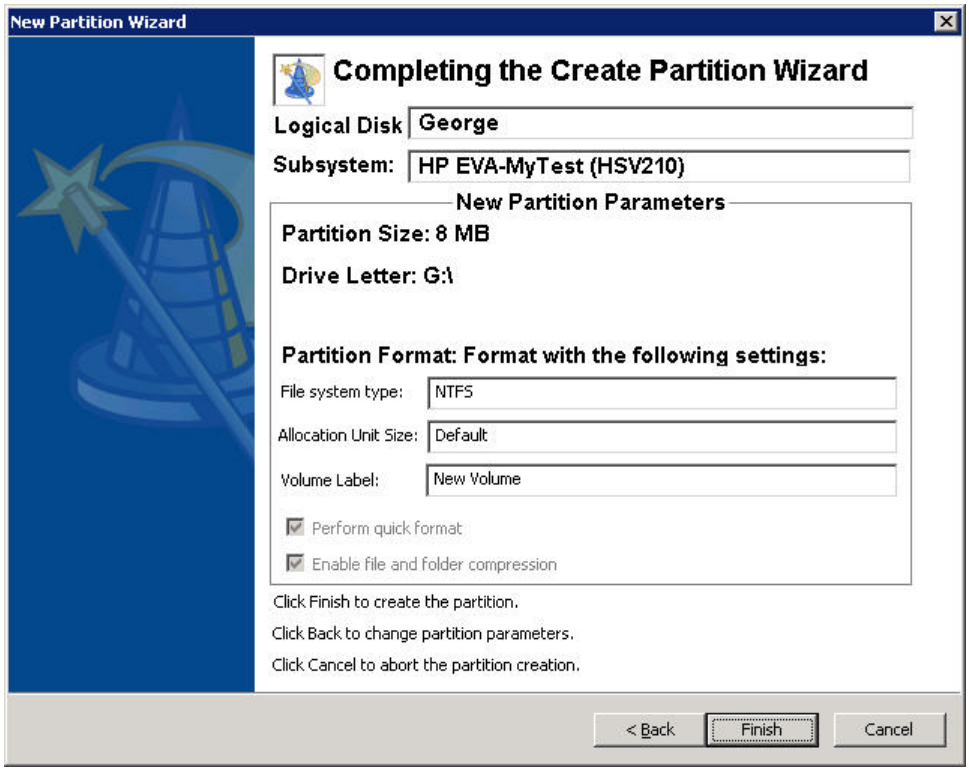

Figure 78 Create New Partition wizard: completing new partition

9. Complete the Create New Partition wizard by choosing one of the following options:
   - To create the partition with these settings and close the wizard, click **Finish**.
   - To return to a previous wizard window and modify the new partition's settings, click **Back**.
   - To stop partition creation, click **Cancel**.

NOTE:
- Partition creation and formatting may be a long process, depending on the partition size and format option.
- You can create up to four (4) partitions on a basic disk.

Managing a partition

Use the Change Drive Letter and Paths dialog box to manage a partition, including:

- Add a partition drive letter or path to a partition
- Change a drive letter or path for a partition
- Format a partition
- View the properties of a disk
- View the properties of the partition

To manage an existing partition:

1. On the Advanced Operations menu, click **Create & Manage Partition**.

   If there is more than one Windows 2003/2008 Server with assigned LUNs, the Server Selection for Partition Management window opens; continue with step 2. If there is only one server with assigned LUNs, SAN Connection Manager automatically selects that server; skip to step 3.
2. If the Server Selection for Partition Management window opens, select the server on which you want to manage a partition, and then click **OK**.

   SAN Connection Manager searches the selected server for new and existing disks. These disks are LUNs that have been created on the storage subsystems and unmasked (assigned) to the server.

   The Create & Manage Partitions dialog box opens; see Figure 75. It shows the LUNs and associated disks on the top part and the map of disks and its partition(s) on the bottom.

   From the disk/partition map, you can initialize new disks, add new partitions, modify or delete existing partitions, and retrieve properties of the disk and partition.
3. To add a partition drive letter or path:
   a. Right-click the partition, and on the shortcut menu, click **Change Drive Letter and Paths**.
   b. On the Change Drive Letter and Paths dialog box (Figure 79), click **Add**.

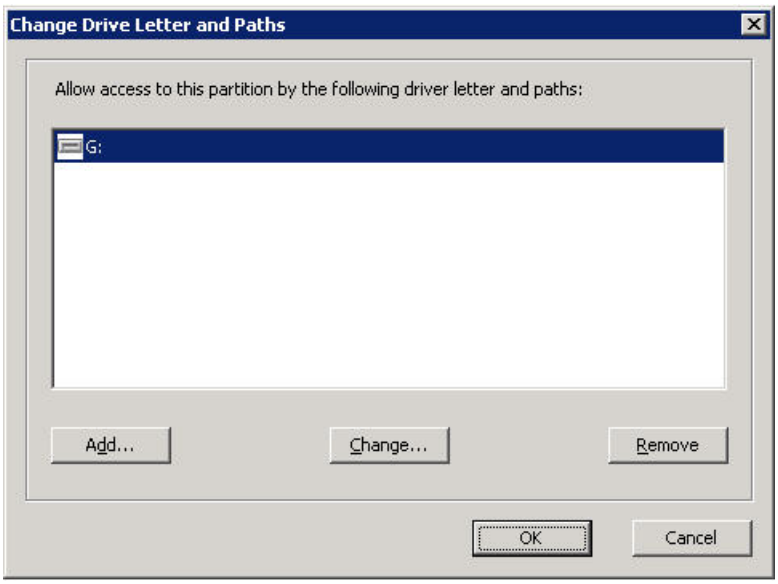

Figure 79 Change Drive Letter and Paths dialog box

The Add Drive Letter or Path dialog box (Figure 80) shows the partition number and size.

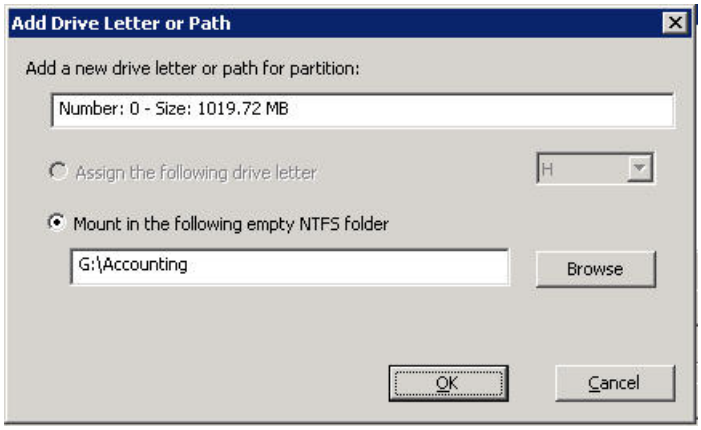

Figure 80 Add Drive Letter or Path dialog box

c. You can either assign a drive letter or mount it on an empty NTFS folder as follows:

- To assign a drive letter to the partition, click **Assign the following drive letter** and select a drive letter from the list. (This option is disabled if the partition already has a drive letter assigned.)
- To mount the partition on an empty NTFS folder (drive path), click **Mount in the following empty NTFS folder** and then either type in the full path name of the folder or click **Browse** to select one. You can mount the partition on more than one empty NTFS folder.

d. To assign the selected drive letter or drive path, click **OK**. To stop, click **Cancel**.

4. To change a partition drive letter or path:

a. Right-click the partition, and on the shortcut menu, click **Change Drive Letter and Paths**.

b. On the Change Drive Letter and Paths dialog box (Figure 79), click **Change**.

The Change Drive Letter dialog box (Figure 81) shows the partition number and size.

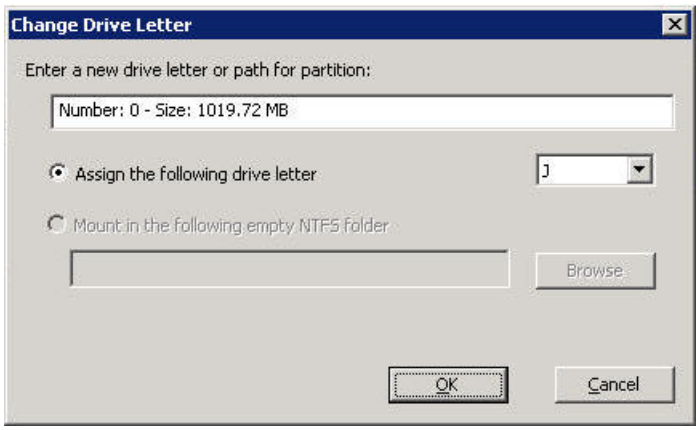

Figure 81 Change Drive Letter dialog box

c. To assign the selected drive letter, click **OK**. To stop, click **Cancel**.

5. To format a partition:
   a. Right-click the partition, and then on the shortcut menu, click **Format**.
   b. In the warning message box, click **Yes** to continue.
      The Format Partition dialog box opens (Figure 82).

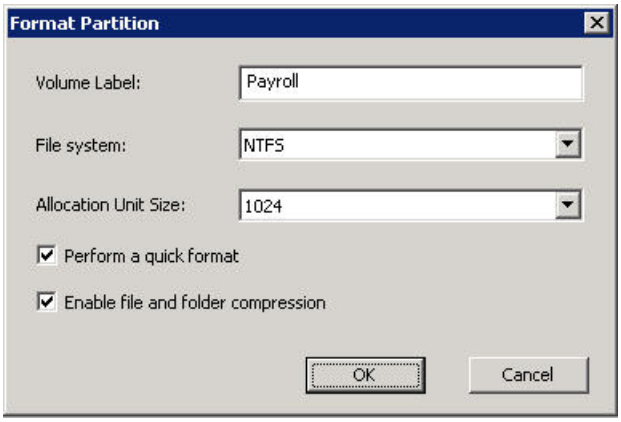

Figure 82 Format Partition dialog box

   c. Complete the following format options:
      - Type a **Volume Label** to identify the volume.
      - Select a **File system** type from the drop-down list.
      - Select the **Allocation Unit Size** from the drop-down list.
      - (Optional) Select the **Perform a quick format** check box.
      - (Optional) Select the **Enable file and folder compression** check box.
   d. To format the partition with these settings, click **OK**. To stop, click **Cancel**.
6. To delete a partition, right-click the partition, and on the shortcut menu, click **Delete Partition**. Click **Yes** in the warning message box. The partition is deleted and the updated disk map is shown.
7. To retrieve the disk's properties, right-click the disk header, and on the shortcut menu, click **Properties**.
   The Disk Information dialog box opens (Figure 83).

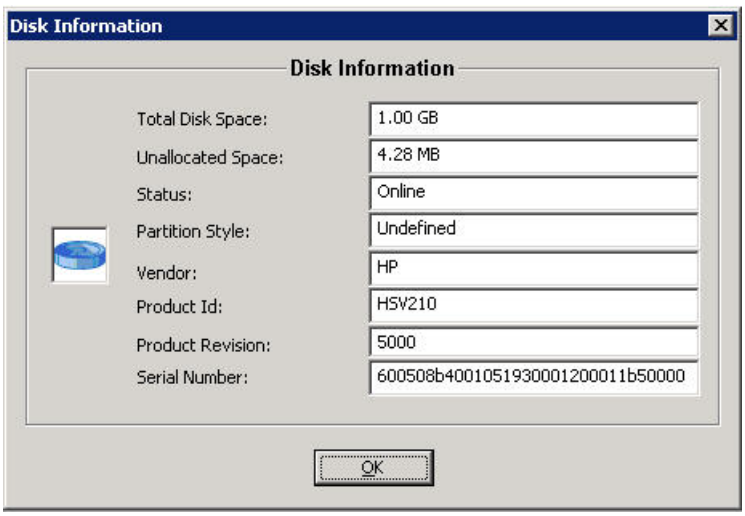

Figure 83 Disk Information dialog box

8. When you have finished viewing the disk information, click **OK** to close the dialog box.

9. To retrieve the partition's properties, right-click the partition, and on the shortcut menu, click **Properties**. The Partition Properties dialog box opens (Figure 84).

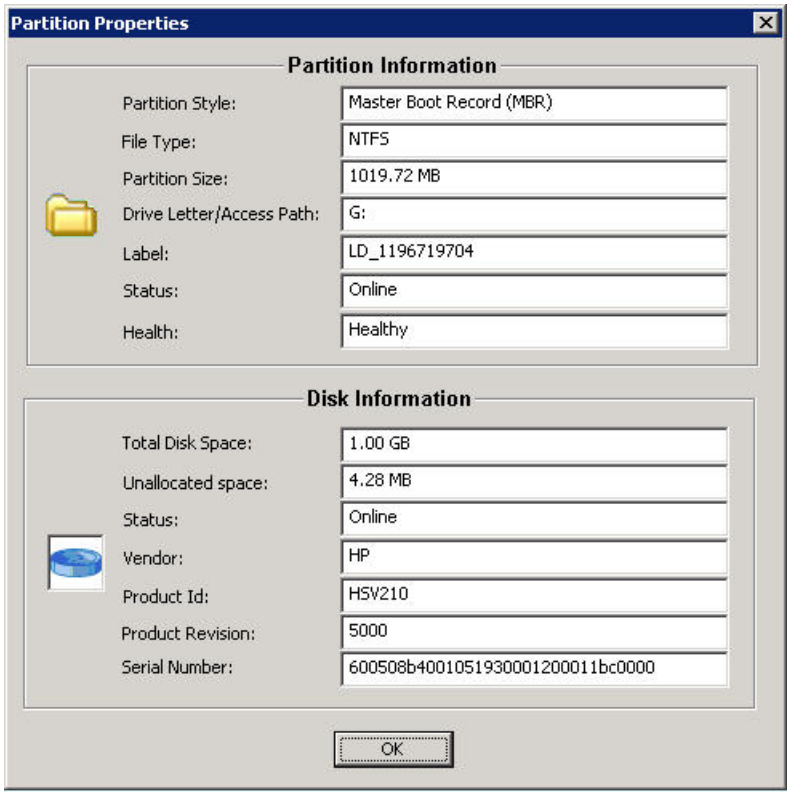

Figure 84 Partition Properties dialog box

10. When you have finished viewing the partition properties, click **OK** to close the dialog box.

9 Viewing VCEM and c-Class Enclosure Properties

This chapter provides procedures for viewing VCEM version 6.1 or later and c-Class Enclosure properties using SAN Connection Manager.

Supported configurations

- VCEM 6.1 or later and Virtual Connect Manager configured to the recommended HP guidelines (all servers and SAN fabrics configured correctly and the VCM managed by VCEM)

  NOTE: HP recommends that VCEM 6.1 or later is installed on a different server from the SCM management station.

- For SAN fabrics, SCM supports both *factory default* and *VC* WWN addresses. With VC defined WWN addresses, additional host to blade/bay associations are available.

Viewing VCEM information

SAN Connection Manager provides easy access to information about VCEM within your SAN. Use the VCEM Configuration dialog box to establish associations between each blade and their respective HP BladeSystem c-Class Enclosure.

To log in and view VCEM configuration:

1. Start the SAN Connection Manager. See "Starting SAN Connection Manager" on page 32.
2. Open the VCEM Configuration dialog box (Figure 85).
3. Check in the **Enable VCEM Discovery** check box.
4. Enter the username and password, and then enter the IP address of the VCEM host server.
5. Click **OK**.

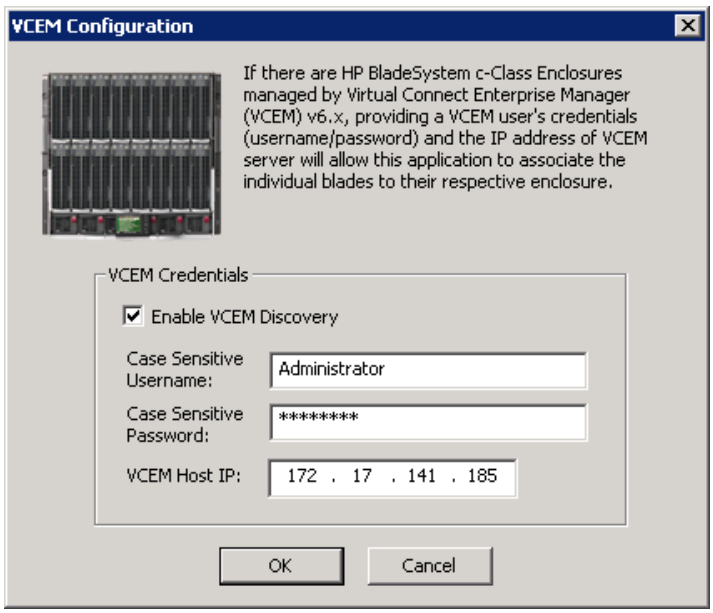

Figure 85 SCM VCEM Configuration

After successfully integrating SCM and VCEM, the topology refreshes and hosts that are actually blades within an enclosure have the associations displayed in the topology.

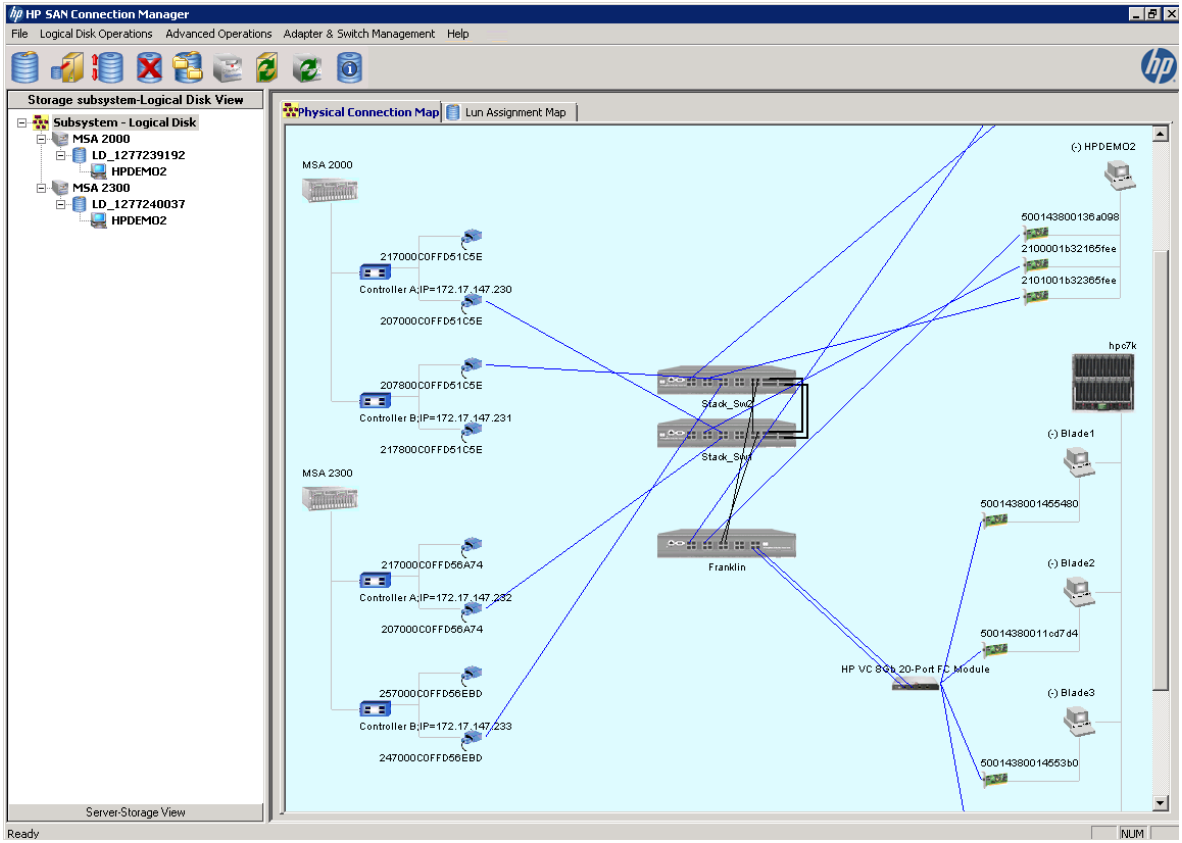

Figure 86 c-Class Server Storage Information

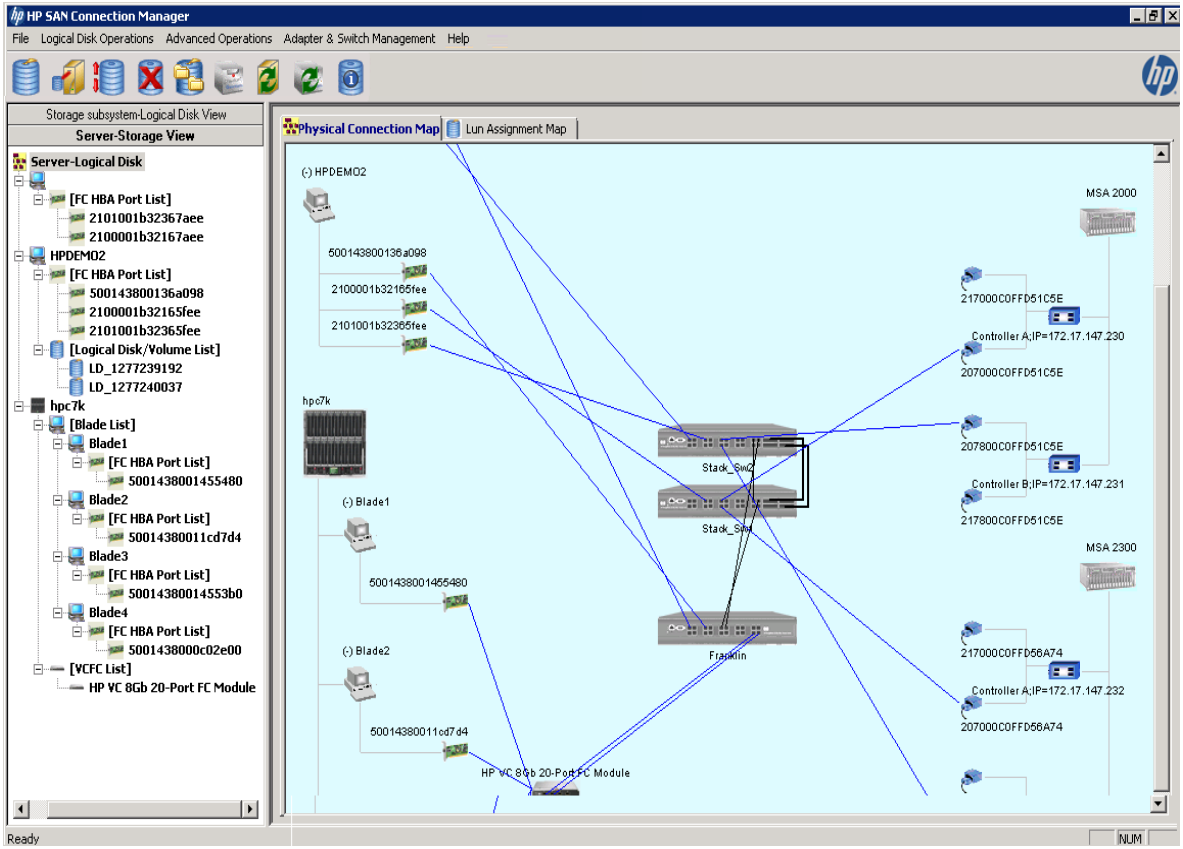

Figure 87 c-Class Server Logical Information

The FC HBA Information includes the following read-only information:

- FC HBA Information:
  - Model
  - Serial #
  - # Targets
  - Port Name
  - Firmware Version
  - HBA Status
  - Node Name
  - BIOS Version
  - Driver Version
- HBA Connected Target List:
  - Target Port Name/Subsystem Port (see note)
  - Node Name
  - Port ID
  - Vendor
  - Product ID

NOTE: The Target Port Name/Subsystem Port column lists the names of the target ports connected to the HBA. Click the + symbol to the left of the Target Port Name to reveal the name of the matching port on the subsystem in the SAN. Click the + symbol to the left of the Subsystem Port Name to reveal the identifiers of the subsystem, controller, and IP address, and the port status.

To view information about a VCEM configuration:

1. In the Server-Storage View group of the navigation pane, click the blade you want to view. The content pane (Figure 88) shows the FC blade Information for that blade.

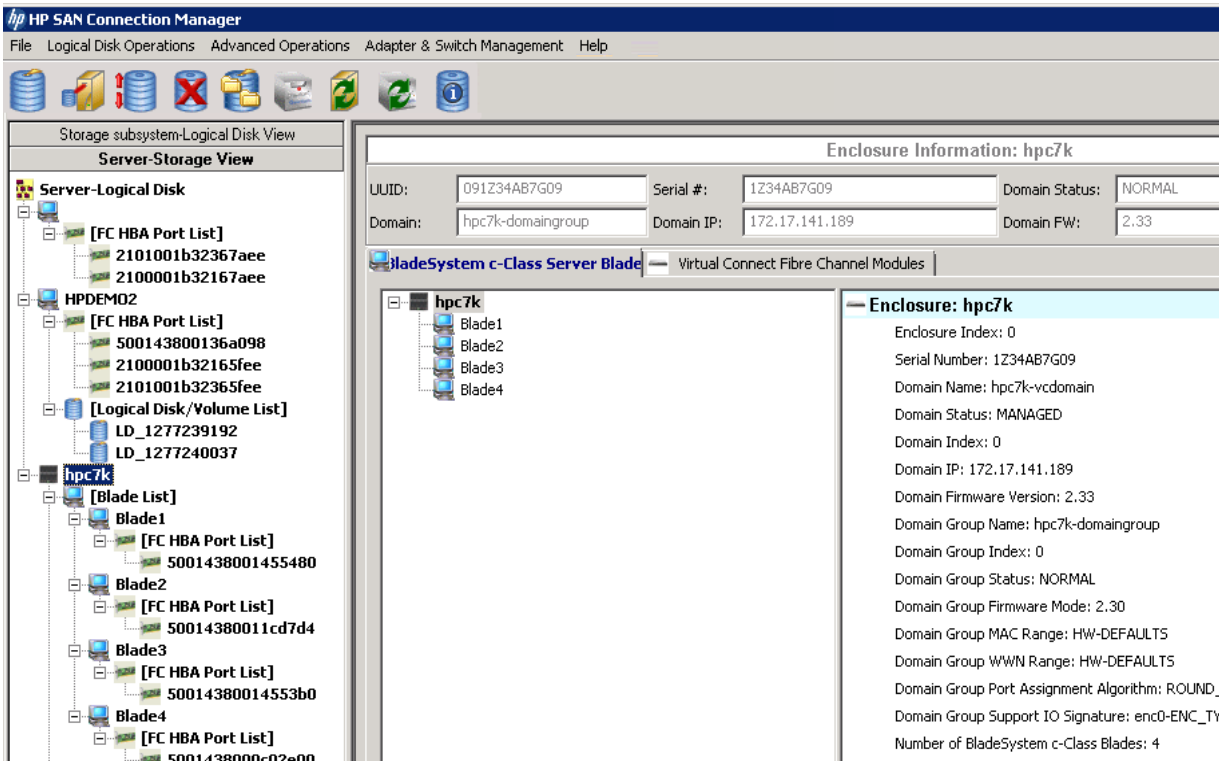

Figure 88 Enclosure Properties Information

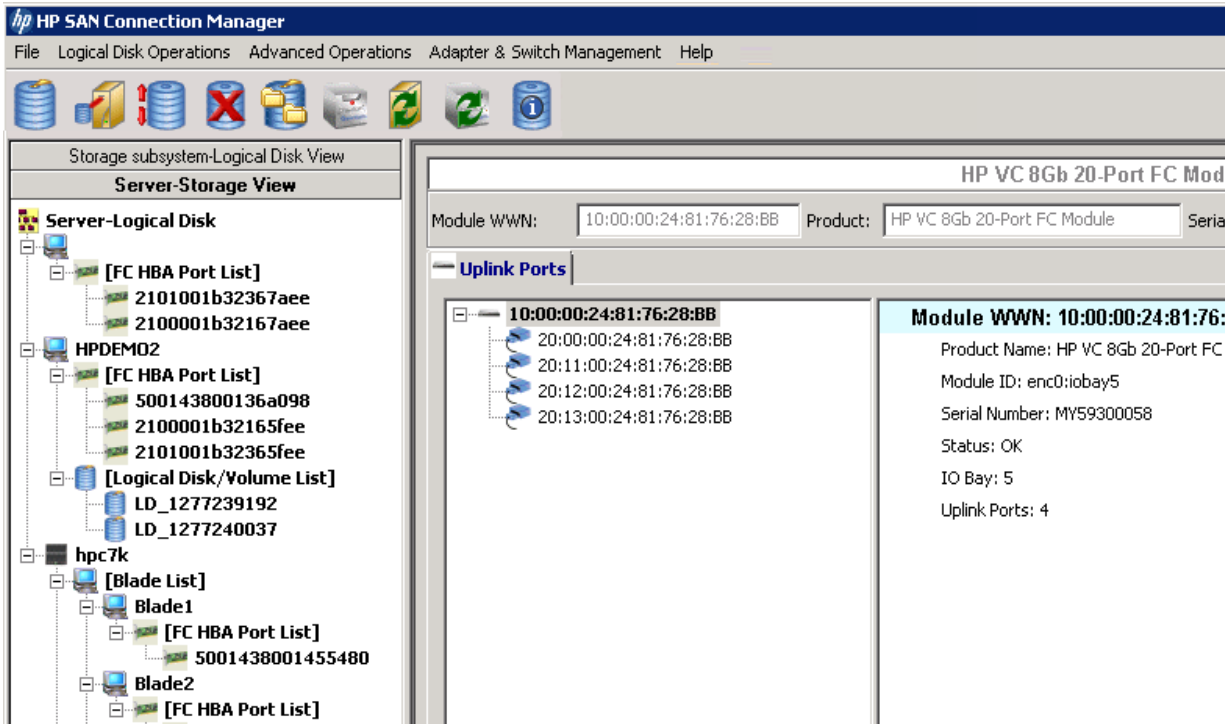

Figure 89 VC-FC Properties Information

Viewing server-to-blade information

SAN Connection Manager provides easy access to information about each server/blade within your SAN, as well as details about the drives, logical disks, and volumes on the server/blade.

To view information about a server/blade:

- In the navigation pane under Server-Storage View, click the blade you want to view.
  The content pane (Figure 90) shows information for the selected blade.

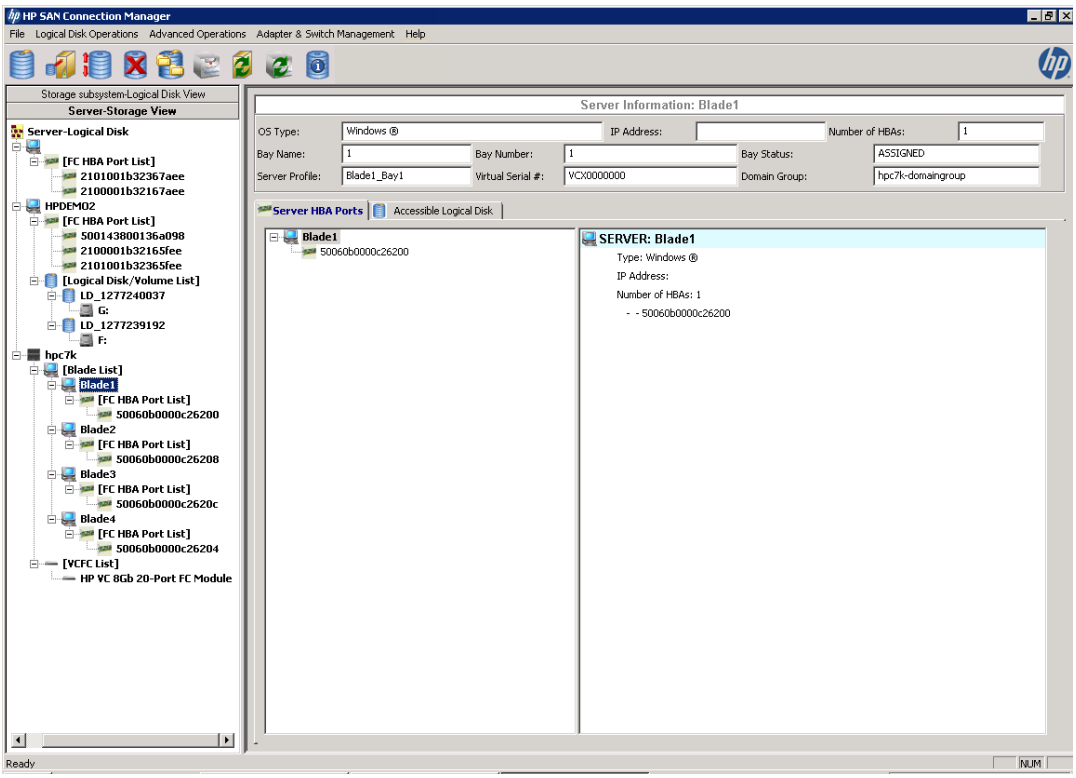

Figure 90 Server/Blade Information

This pane includes the following read-only information:

- Server Information header:
  - OS Type
  - IP Address
  - Number of HBAs
  - Bay Name
  - Bay Number
  - Bay Status
  - Server Profile
  - Virtual Serial Number
  - Domain Group
- Server HBA Ports tab:
  - Model
  - Node Name
  - Serial Number
  - Firmware Version
  - BIOS Version
  - Driver Version
  - HBA Status
  - Number of Connected Targets
- Server Accessible Logical Disk tab:
  - Device Type
  - Vendor ID
  - Product ID
  - Product Revision
  - Serial Number
  - Bus Type
  - Rebuild Priority
  - LUNs Active Controller(s)
  - LUN Flags

10 Managing Storage Subsystems

This chapter provides the procedures for managing your storage subsystems (storage arrays).

Viewing subsystem information

SAN Connection Manager provides easy access to information about each subsystem within your SAN.

To view information about a subsystem:

1. In the navigation pane under Storage subsystem-Logical Disk View, click the subsystem you want to view.

   The content pane (Figure 91) shows the Subsystem Information.

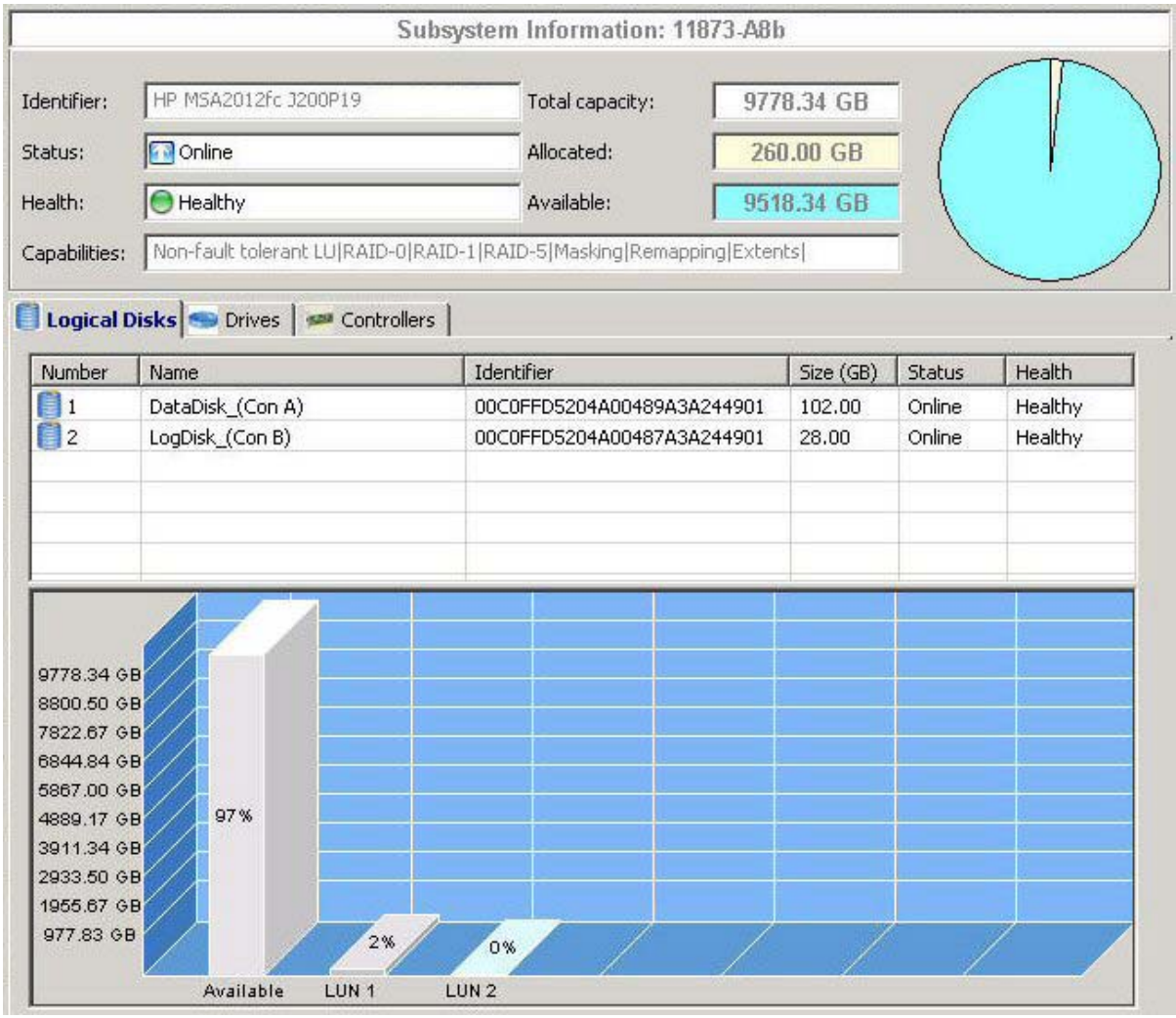

Figure 91 Subsystem Information

The following read-only information is shown for the selected subsystem:

- Subsystem Information:
  - Identifier
  - Status
  - Health
  - Capabilities
  - Total Capacity (in GB)
  - Allocated (in GB)
  - Available (in GB)

2. To view additional information about the selected storage subsystem, click the following tabs:
   - **Logical Disks**
   - **Drives**
   - **Controllers**

Managing storage subsystems

SAN Connection Manager provides the ability to quickly manage your storage subsystems, including the controllers and drives.

TIP: You can also manage EVA and MSA storage subsystems with the management utility included with that subsystem. To access the utility, view either the Physical Connection map or LUN assignment map, right-click a storage subsystem icon, and on the shortcut menu, click **Launch Subsystem Management Application**.

To manage a storage subsystem:

1. To access the Manage Storage Subsystem dialog box, choose one of the following options:
   - On the Advanced Operations menu, click **Manage Storage Subsystem**. Then, on the Select a Subsystem dialog box, select the storage subsystem you want to manage and click **OK**.
   - In the navigation pane, right-click the subsystem you want to manage, and then on the shortcut menu, click **Manage Storage Subsystem**.

   The Manage Storage Subsystem dialog box (Figure 92) opens and shows a graphical representation of the selected subsystem, including the controller(s) and individual drives that comprise the subsystem.

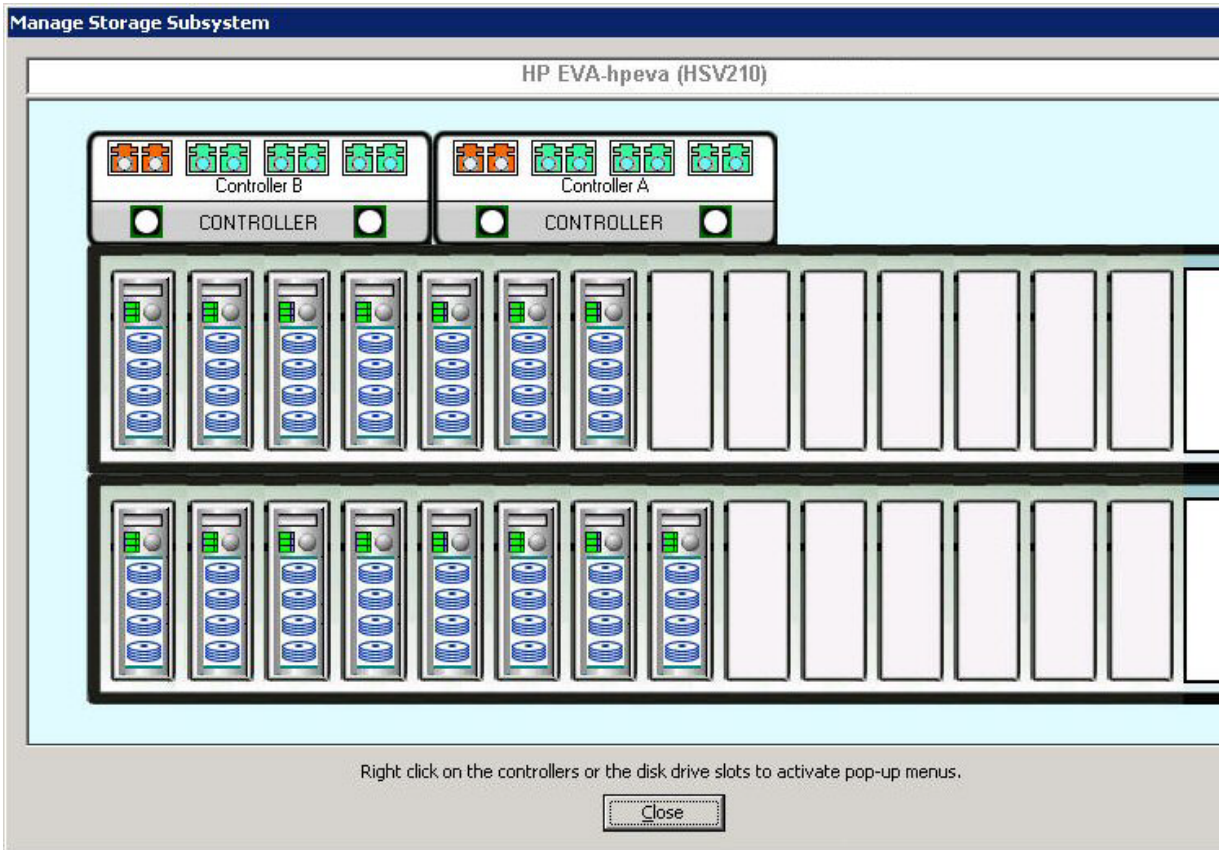

Figure 92 Manage Storage Subsystem dialog box

2. (Optional) Manage the controller by right-clicking a controller icon to open a shortcut menu. The shortcut menu may contain the following items (not all menu items are available for every controller):
   - **Reset Controller** (MSA storage only)—Reinitializes all controllers and invalidate their caches.
   - **Controller Details**—Displays all of the selected controller (Figure 93), including its name, status, identifier, and health. It also lists its ports and active logical disks.

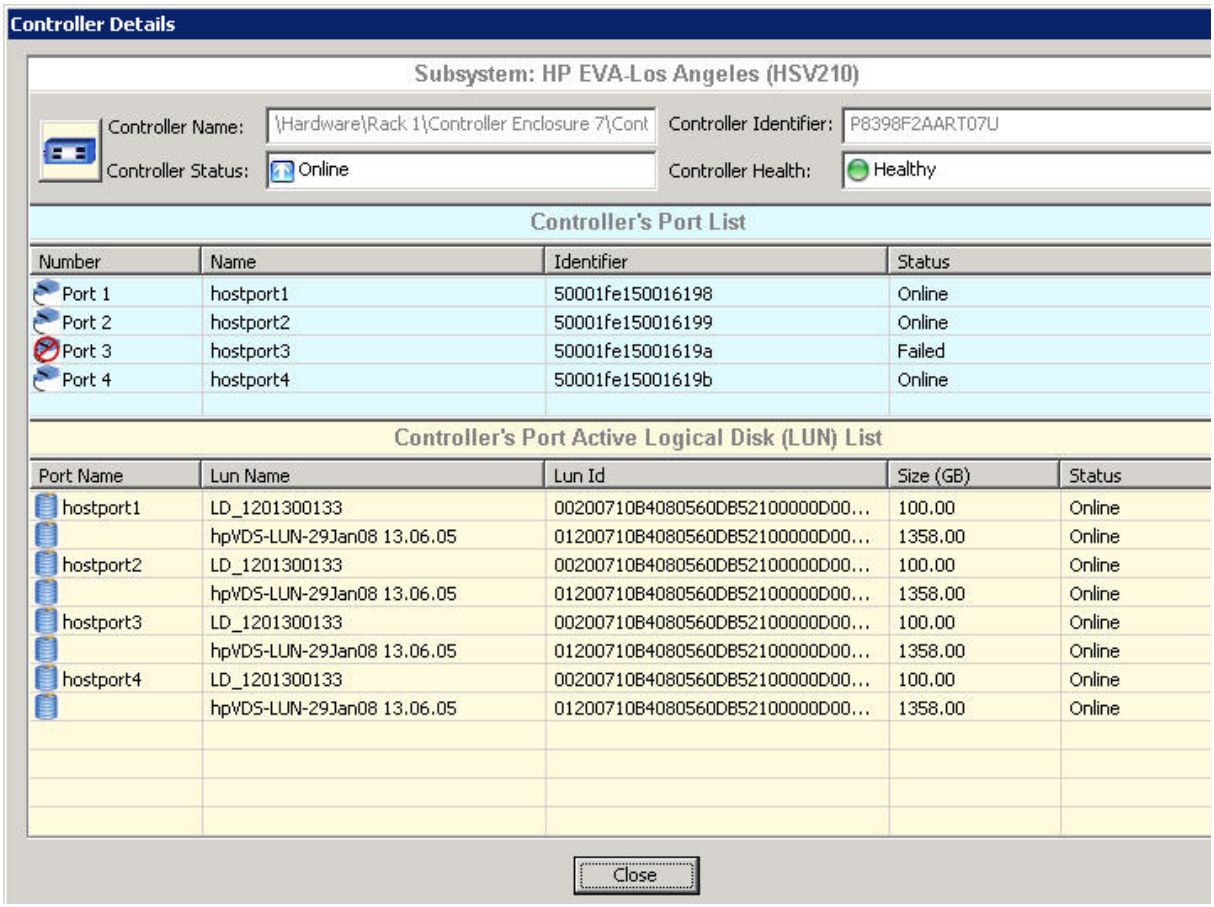

Figure 93 Controller Details dialog box

3. (Optional) Manage the disk drives by right-clicking a drive icon to open a shortcut menu. The shortcut menu may contain the following items (not all menu items are available for every disk drive):
   - **Set Drive as Hot Spare** (MSA storage only)—Designates the selected drive as a standby drive in case another drive fails (Figure 94).
   - **Remove Drive as Hot Spare** (MSA storage only)—Returns the selected drive to the pool of drives available for logical disk creation.
   - **Blink Drive** (MSA storage only)—Begins blinking an LED indicator on the drive so that you can identify it (Figure 94).
   - **Stop Drive Blinking** (MSA storage only)—Stops blinking the LED indicator that you have previously set to blink.
   - **Set Drive Status** (MSA storage only)—Opens the Set Drive Status dialog box (Figure 95) to a status (for example, available, offline, not ready, or failed).
   - **Drive Details**—Opens the Drive Details dialog box (Figure 96) and displays details of the selected disk drive, including its name, status, identifier, health, bus, slot, and size. Additional details include the storage pool name, RAID type, and a list of its logical disks.

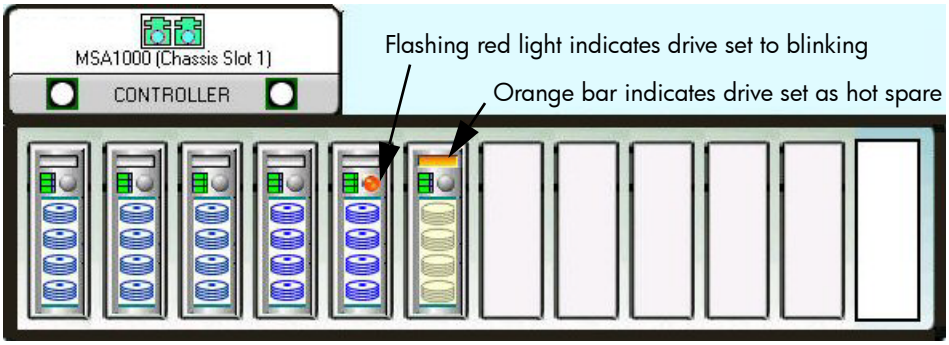

Figure 94 Drive blinking and drive set as hot spare examples

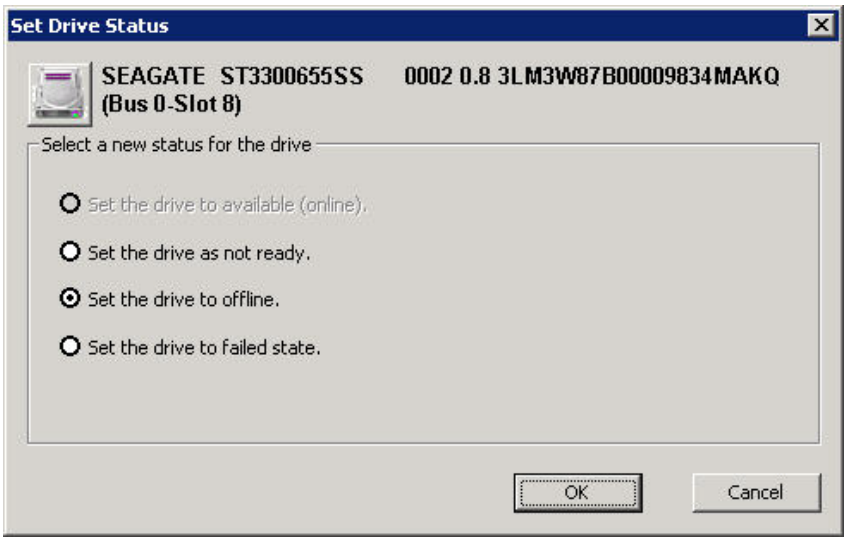

Figure 95 Set Drive Status dialog box

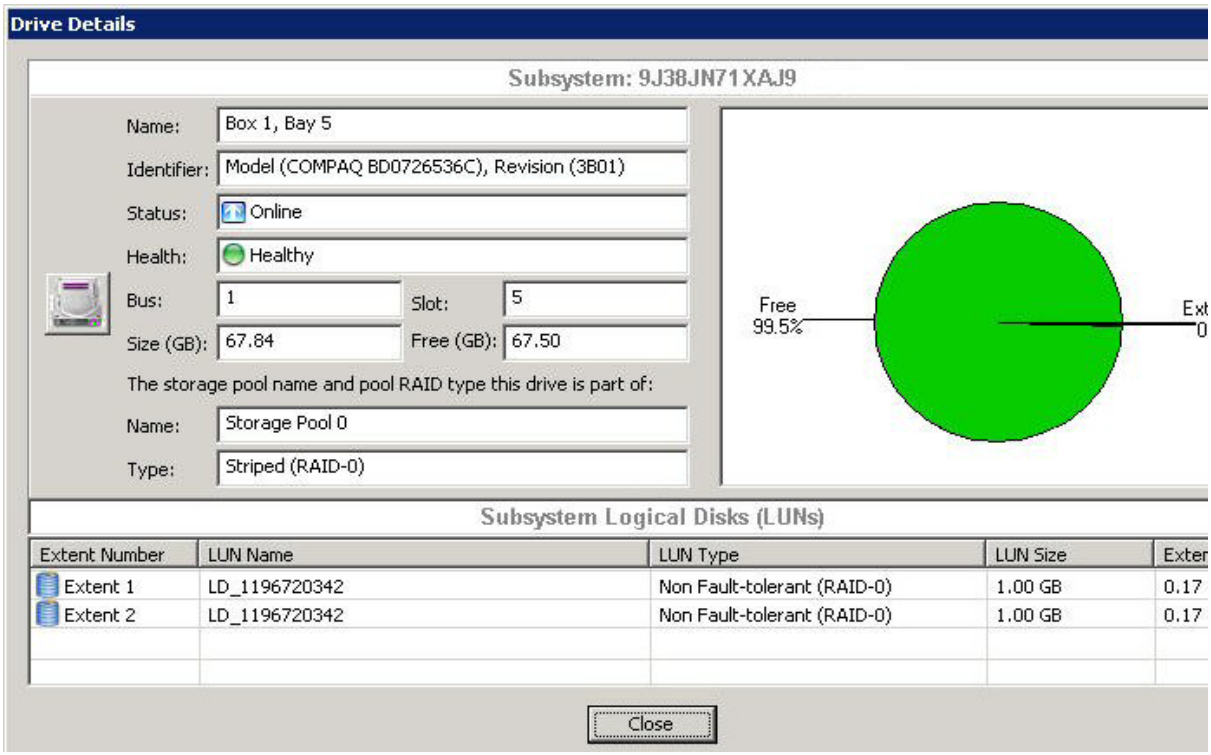

Figure 96 Drive Details dialog box

4. Click **Close** to exit the dialog box.

Refreshing the storage subsystem list

SAN Connection Manager provides the ability to quickly refresh a subsystem on your SAN. Refreshing the subsystem list shows the most current topology of your SAN in the Physical Connection and LUN Assignment maps. It also discovers any status change in the subsystem's drives, controllers, and logical disks.

To refresh the storage subsystem list:

1. On the Advanced Operations menu, click **Refresh the Storage Subsystem List**.

   A message box states the refresh will delete all existing data and rebuild the list, and asks if you want to continue.

> **IMPORTANT:** Refreshing the subsystem could take a while depending on the number of subsystems, each subsystem's IO traffic, and its number of drives and logical disks.

2. To continue, click **Yes**.

Changing the discovery refresh intervals

SAN Connection Manager automatically polls system components (host, switch, storage device) for the most current information to display. You can configure how often each system component is polled using the Change Discovery Refresh Interval option. System components are polled only when SCM is not running. The minimum value is determined dynamically upon each discovery. SCM will check to ensure you don't go below the minimum. The maximum value is one week.

To configure the discovery refresh intervals:

1. On the Advanced Operations menu, click **Change Discovery Refresh Interval**.

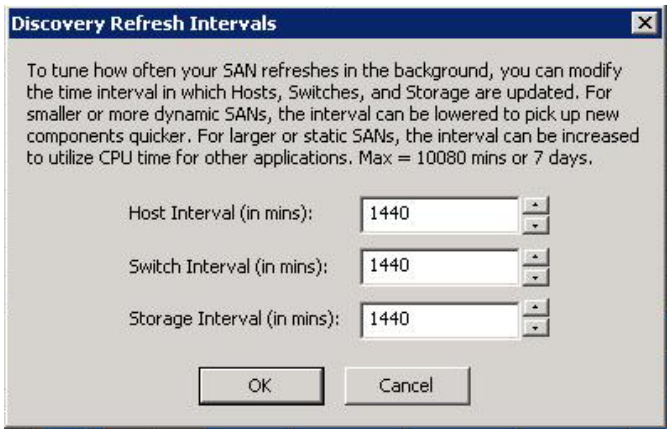

Figure 97 Discovery Refresh Intervals dialog box

2. On the Discovery Refresh Intervals dialog box, choose one of the following:
   - Click the up or down arrows next to the text box to change the number of minutes.
   - Type the number of minutes in the text box.
3. Click **OK** to save the changes.

Updating software

When SAN Connection Manager starts up, it automatically compares the current versions of the SCM software components to the newest versions of SCM software components available for download on the HP website. If SCM detects a newer version, the Updated Components dialog box appears automatically (Figure 98) and prompts you to download the newest version. You can also manually check for the latest versions of SCM software components. Click **Check for Updates** on the Advanced Operations menu.

The following SCM software components are available for updates:

- Storage subsystem firmware
- Switch firmware
- HBA driver
- Application deployment templates

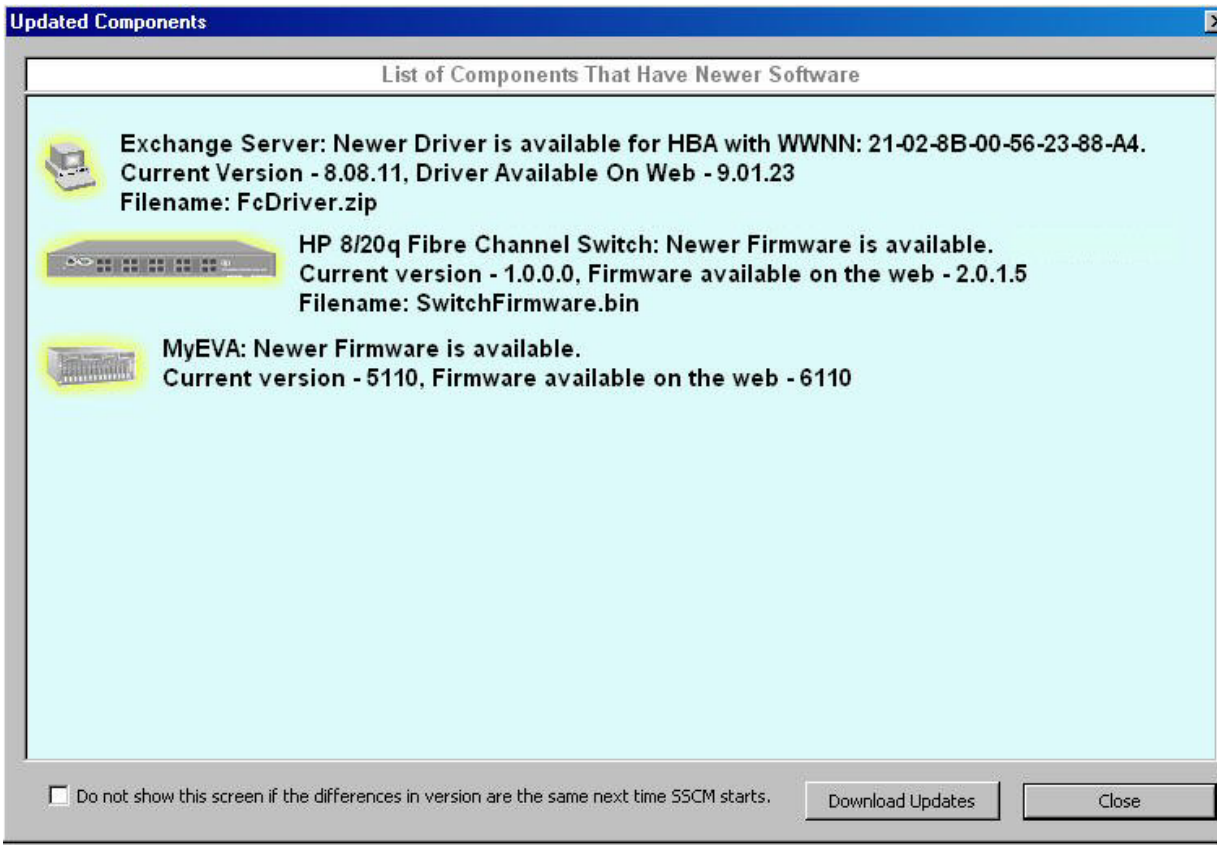

Figure 98 Updated Components dialog box (storage subsystem firmware)

To update storage subsystem firmware:

1. On the Updated Components dialog box, choose one of the following options:
   - To obtain the later firmware version, click **Download Updates**.

     NOTE: The Download Updates button does not actually download the new storage subsystem firmware. You must go to the HP website to obtain this firmware. Continue with step 2.

   - To disregard the firmware update at this time (it will reappear the next time you start SAN Connection Manager), click **Close**.
   - To prevent the firmware update prompt for the same firmware version from appearing the next time you start SAN Connection Manager, select the **Do not show this screen if the difference in version are the same next time SCM starts** check box, and then click **Close**.

2. If you choose to download the firmware update, follow these steps:
   a. In the Browse for Folder dialog box, select a location for saving the file from the web, and then click **OK**.

      A message box directs you to a location on the HP website.
   b. Make a note of this URL, and then click **OK** to close the message box.
   c. Go to the specified HP web page, and then click **Support & Drivers**.
   d. Locate your storage subsystem, download the newer firmware file, and then copy the file to the location specified in step 2a.

Creating an alias for a storage subsystem

You can create alias (user-friendly) names for storage subsystems to help you easily identify them in SAN Connection Manager.

To create an alias for a storage subsystem:

1. On the Physical Connection or LUN Assignment map, right-click a storage subsystem icon, and then on the shortcut menu, click **Create Storage Subsystem Alias**.

   The Create Storage Subsystem Alias dialog box (Figure 99) shows the subsystem name and identifier.

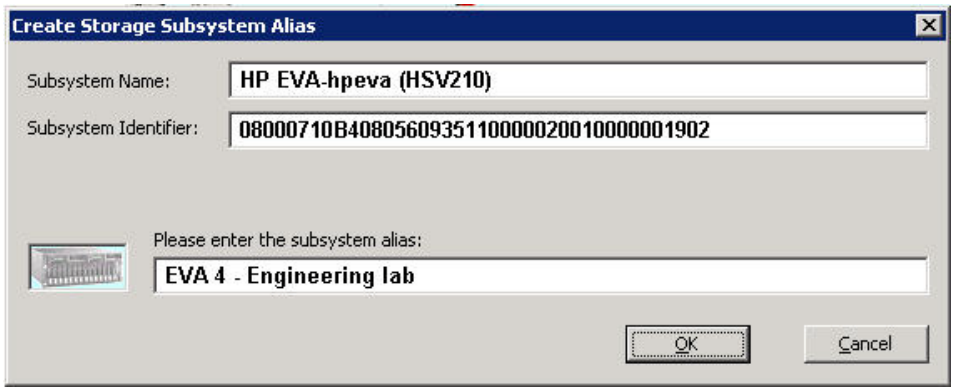

Figure 99 Create Storage Subsystem Alias dialog box

2. Enter an alias name to replace the subsystem name, and then click **OK**.

   The Physical Connection and LUN Assignment maps are updated with the new storage subsystem alias name.

Configuring a storage subsystem

When SAN Connection Manager discovers a new storage subsystem (either MSA or EVA), it prompts you to configure the array (subsystem) using a pre-defined application template that specifies the disk group or storage pool, LUN size, RAID type, and hosts that can access those LUNs. The templates are built for popular applications such as Microsoft Exchange, and the options are customized and tailored from common and widely-known practices.

SAN Connection Manager provides the Storage Deployment wizard to help you configure your subsystem with a pre-defined application template. In addition, advanced users only—those with extensive knowledge of the subsystem's capabilities and features—may opt to configure the subsystem with a custom deployment.

This section describes both storage deployment options:

- "Configuration using a pre-defined application template," page 128
- "Configuration using a customized deployment," page 131 (advanced users only)

Configuration using a pre-defined application template

Follow the procedure in this section to configure or reconfigure your EVA or MSA storage subsystem using one of the pre-defined application templates provided in SAN Connection Manager.

NOTE: Application template deployment can only create partitions for Windows servers using QLogic-based HBAs.

To configure a subsystem using a pre-defined application template:

1. Start the Storage Deployment wizard automatically or manually as follows:
   - Automatic: If, when you start SAN Connection Manager, it detects either an uninitialized EVA storage subsystem or an MSA storage subsystem that does not have any subsystem or LUN created, a message box prompts you to configure the subsystem. To start the Storage Deployment wizard, click **Yes**.
   - Manual: Follow these steps to manually start the wizard:
     a. On the Advanced Operations menu, click **Configuration using Application Templates**.
     b. If you have multiple subsystems, the Select a Subsystem dialog box prompts you to select the storage subsystem you want to configure. Select your subsystem, and then click **OK**.

        If the selected subsystem already has logical disks containing data, SAN Connection Manager displays a message warning that the storage subsystem will be uninitialized and all logical disks and their data will be deleted.
     c. To acknowledge the warning, uninitialize the storage subsystem, delete all logical disks, and start the Storage Deployment wizard, type **YES,** and then click **OK**. To abandon this deployment, click **Cancel**.

   SAN Connection Manager loads the storage templates and launches the wizard. If the storage subsystem is an HP EVA, the window shown in Figure 100 opens; proceed with step 2. If the storage subsystem is an HP MSA, the wizard window is not shown; skip to step 3.

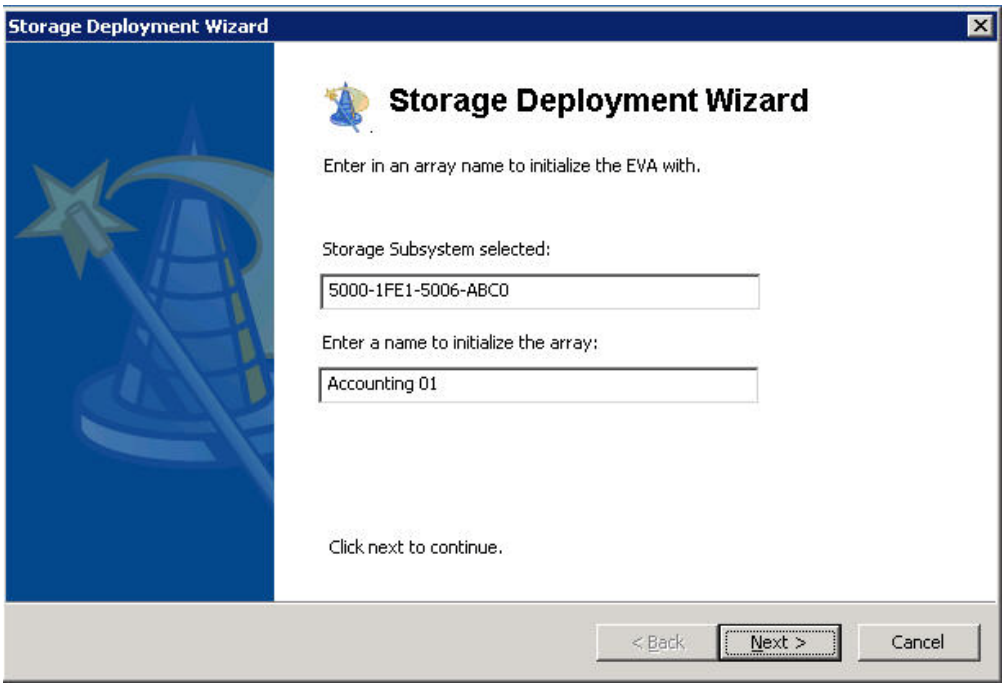

Figure 100 Storage Deployment wizard: enter EVA array name (template deployment)

2. In the Enter a name to initialize the array box, type a name for the EVA storage subsystem, and then click **Next**. Valid names are a maximum of 32 alphanumeric characters, and may contain spaces, underscores, and special characters.

   The Storage Deployment wizard lists templates available for storage configuration (Figure 101). This list is dynamically created by SAN Connection Manager based on the list of files detected in the `templates` folder.

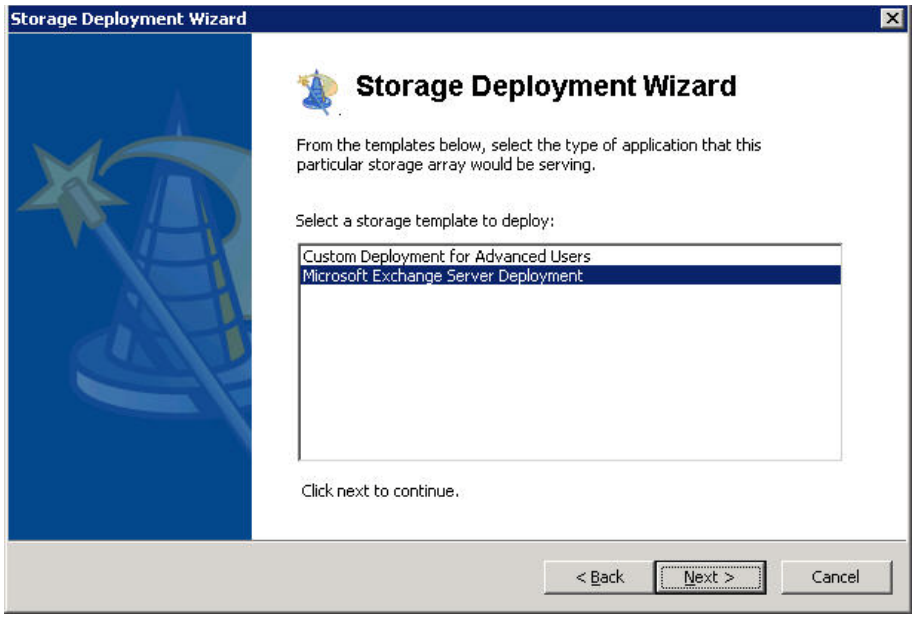

Figure 101 Storage Deployment wizard: select a template (template deployment)

3. To configure the subsystem using one of the default templates, select the template name from the list of discovered template types, and then click **Next**.

> **NOTE:** This release of SAN Connection Manager provides only the Microsoft Exchange Server Deployment template. Other templates will be included in future releases, or may be available for download from the HP website.

The wizard lists deployment options for the selected template. Figure 102 shows the options available for the Microsoft Exchange Server Deployment template.

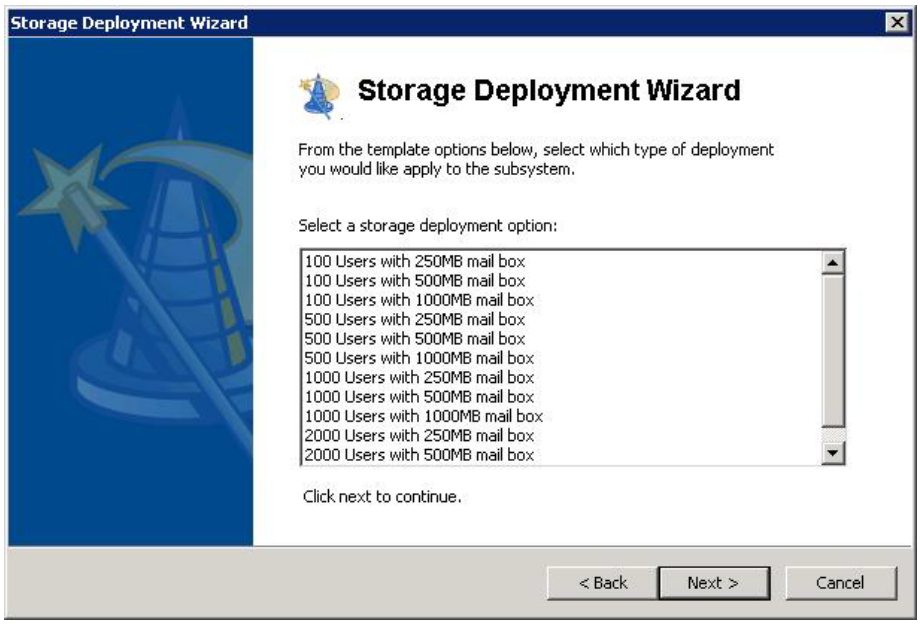

Figure 102 Storage Deployment wizard: select template options (template deployment)

4. Select one of the storage deployment options from the list, and then click **Next**. For example, for the Microsoft Exchange template, select the option that most closely indicates the maximum number of users and maximum mail box capacity for the data to be stored on this storage subsystem.

   The next Storage Deployment wizard window (Figure 103) lists each server and its operating system.

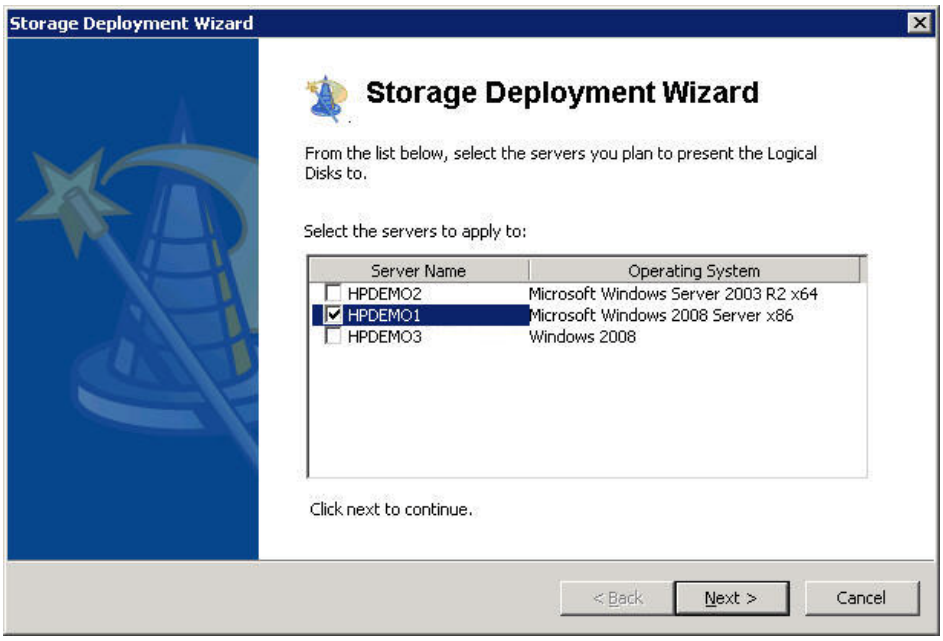

Figure 103 Storage Deployment wizard: select servers (template deployment)

5. Under Server Name, select one or more check boxes indicating the server(s) to which you want to assign (present) the logical disks in this storage subsystem, and then click **Next**.

NOTE: In general, you should select just one server. However, if each server represents one node in a clustered environment, you can select two or more servers. If you choose not to select any servers, you must later manually assign the LUNs defined in this deployment to the servers (see "Assigning and unassigning a logical disk to a server," page 95).

Before proceeding with configuring the storage subsystem with the selected option, the wizard displays a summary of the selection and resulting actions (Figure 104).

Figure 104 Storage Deployment wizard: summary (template deployment)

6. Verify the information and then select one of the following options:
   - To confirm and complete the wizard, click **Deploy**.
   - To return to previous wizard windows and review or change your selections, click **Back**.
   - To abandon all selections made using the Storage Deployment wizard, click **Cancel**.

   If you click **Deploy**, using the HP SSSU or the subsystem VDS hardware provider, SAN Connection Manager initializes the subsystem, creates disk groups or storage pools and LUNs, and presents those LUNs to the host(s) as specified in the deployment summary shown in Figure 104.

   If the selected subsystem already has logical disks containing data, SAN Connection Manager displays a message warning that the storage subsystem will be uninitialized and all logical disks and their data will be deleted.
7. To acknowledge the warning, uninitialize the storage subsystem, delete all logical disks, and start the Storage Deployment wizard, type **YES**, and then click **OK**. To abandon this deployment, click **Cancel**.

   If the configuration is successful, the results display in the dialog box. If the partition is created from the LUNs, the volume name and drive letter assigned for each LUN (Figure 105) display in the dialog box.

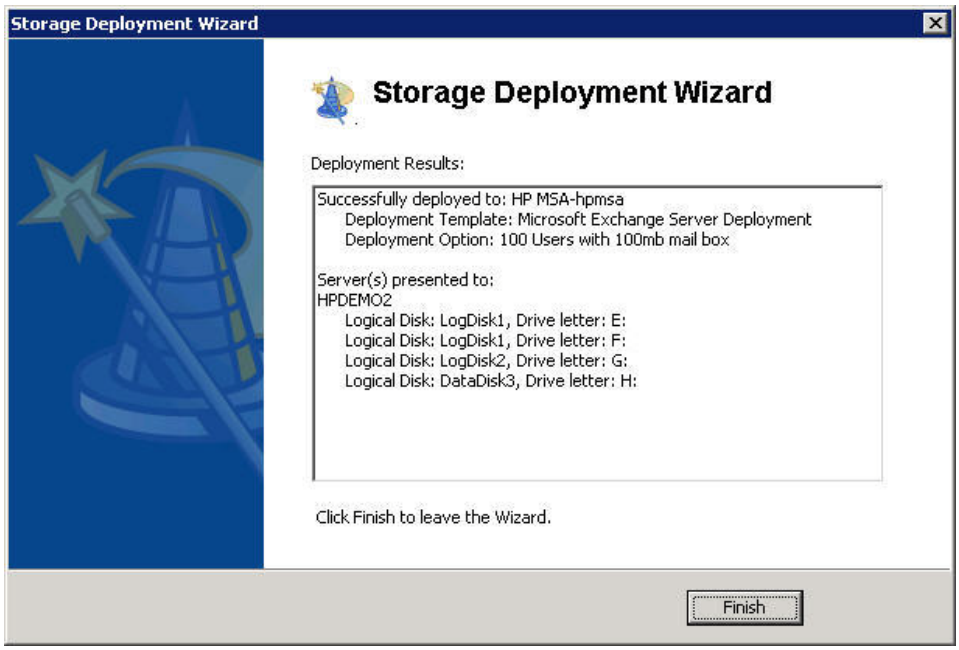

Figure 105 Storage Deployment wizard: deployment results (template deployment)

Configuration using a customized deployment

Advanced users may create a customized deployment to configure the storage subsystem. To use a customized deployment, you must have extensive knowledge of the subsystem's features and capabilities. For example, you must know the number of physical disks, the number of disks required for a disk group or storage pool, the LUN types, and the Vraid or RAID types allowed for the LUN.

△ **CAUTION:** Attempt custom deployment only if you are an advanced user with extensive knowledge about the storage subsystem that you want to configure.

IMPORTANT: The following limitations apply to customized deployment for the MSA 2000 family:

- A maximum of 16 virtual disks (disk groups) are allowed per controller.
- All LUNs on a virtual disk must be of the same RAID level.
- You cannot combine SAS and SATA drives in the same virtual disk.
- The minimum and maximum number of disk drives for each RAID level are as follows

RAID Level	Minimum Drives	Maximum Drives
0	2	16
1	2	16
5	3	16
6	4	16

To configure a subsystem using a customized storage deployment:

1. Start the Storage Deployment wizard automatically or manually as follows:
   - Automatic: If, when you start SAN Connection Manager, it detects either an uninitialized EVA storage subsystem or an MSA storage subsystem that does not have any subsystem or LUN created, a message box prompts you to configure the subsystem. To start the Storage Deployment wizard, click **Yes**.
   - Manual: Follow these steps to manually start the wizard:
     a. On the Advanced Operations menu, click **Configuration using Application Templates**.
     b. If you have multiple subsystems, the Select a Subsystem dialog box prompts you to select the storage subsystem you want to configure. Select your subsystem, and then click **OK**.
     If the selected subsystem already has logical disks containing data, SAN Connection Manager displays a message warning that the storage subsystem will be uninitialized and all logical disks and their data will be deleted.
     c. To acknowledge the warning, uninitialize the storage subsystem, delete all logical disks, and start the Storage Deployment wizard, type **YES,** and then click **OK**. To abandon this deployment, click **Cancel**.

   SAN Connection Manager loads the storage templates and launches the wizard. If the storage subsystem is an HP EVA, the window shown in Figure 106 opens; proceed with step 2. If the storage subsystem is an HP MSA, the wizard window is not shown; skip to step 3.

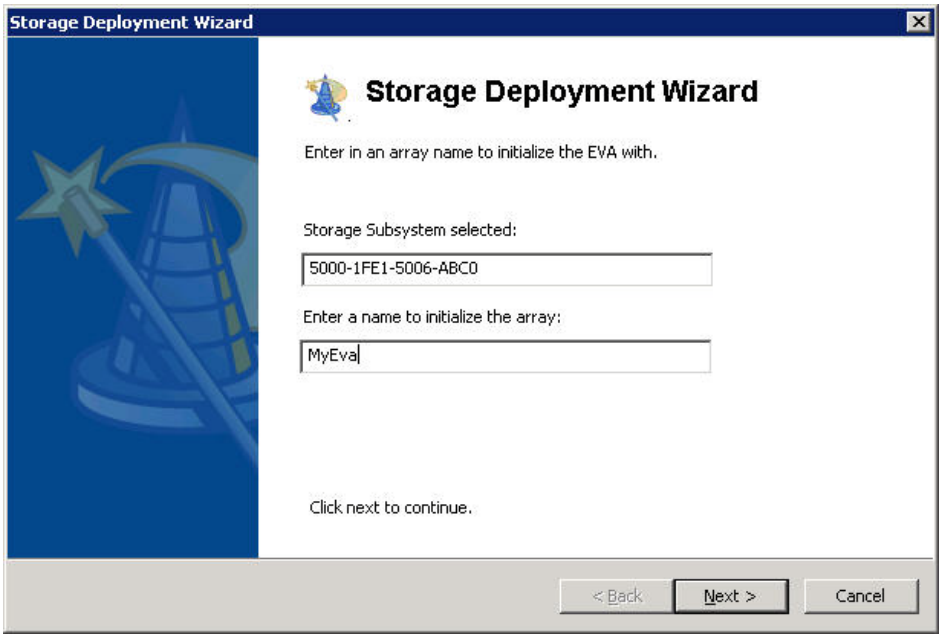

Figure 106 Storage Deployment wizard: enter EVA array name (custom deployment)

2. In the Enter a name to initialize the array box, type a name for the EVA storage subsystem, and then click **Next**. Valid names are a maximum of 32 alphanumeric characters, and may contain spaces, underscores, and special characters.

   The Storage Deployment wizard lists templates available for storage configuration (Figure 107). This list is dynamically created by SAN Connection Manager based on the list of files detected in the `templates` folder.

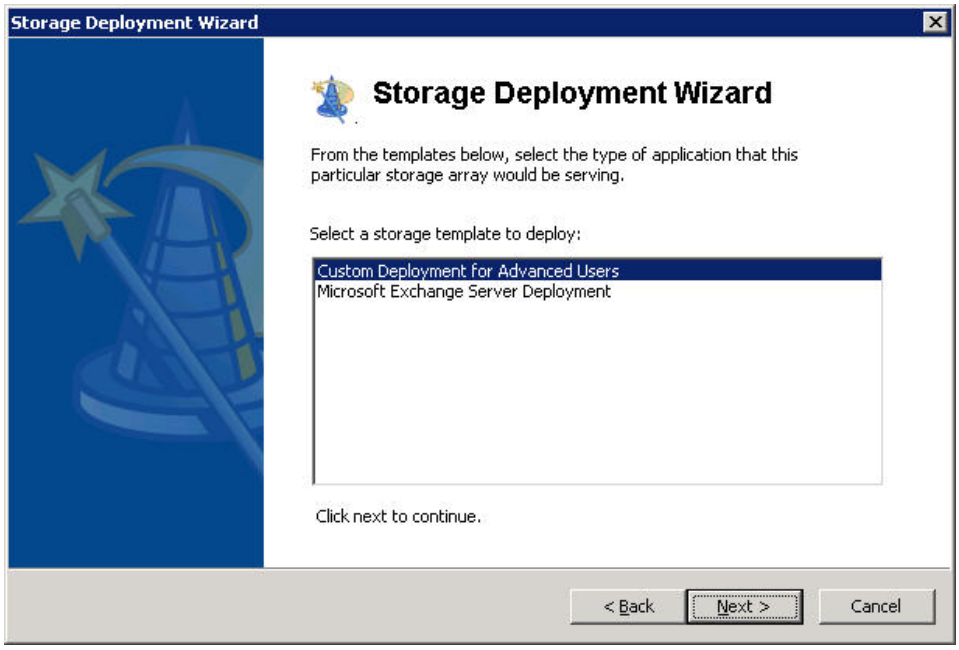

Figure 107 Storage Deployment wizard: select a template (custom deployment)

3. To configure the subsystem using a custom deployment, select **Custom Deployment for Advanced Users**, and then click **Next**.

   The wizard prompts you to create either *disk groups* for EVA storage subsystems or *storage pools* for MSA storage subsystems. The terms *disk groups* and *storage pools* both refer to sets of physical disks in the storage subsystem. Figure 108 shows an example of disk group creation for EVA; Figure 109 shows an example of storage pool creation for MSA.

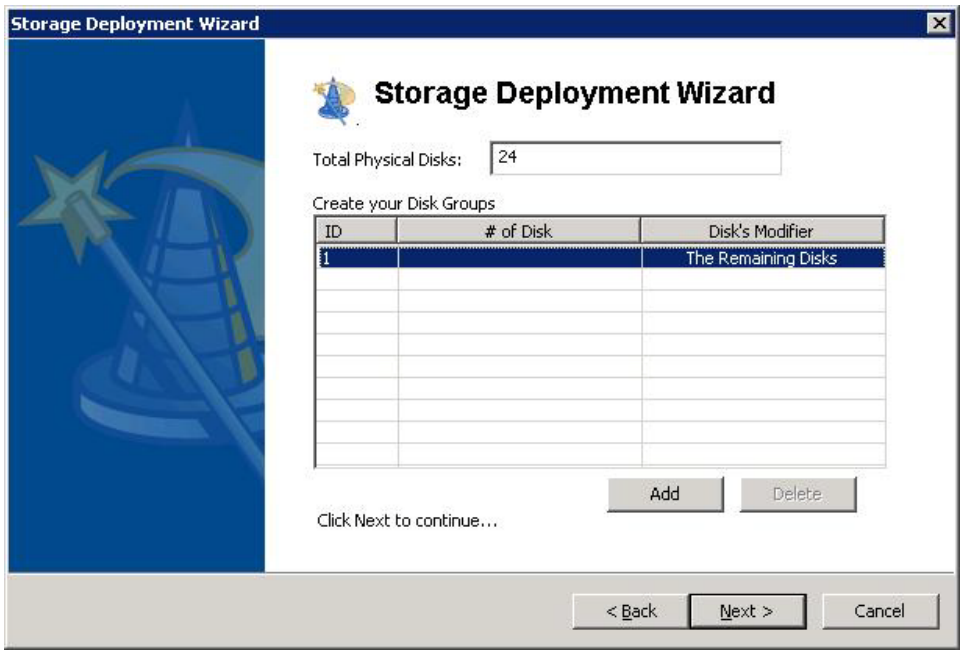

Figure 108 Storage Deployment wizard: create EVA disk groups (custom deployment)

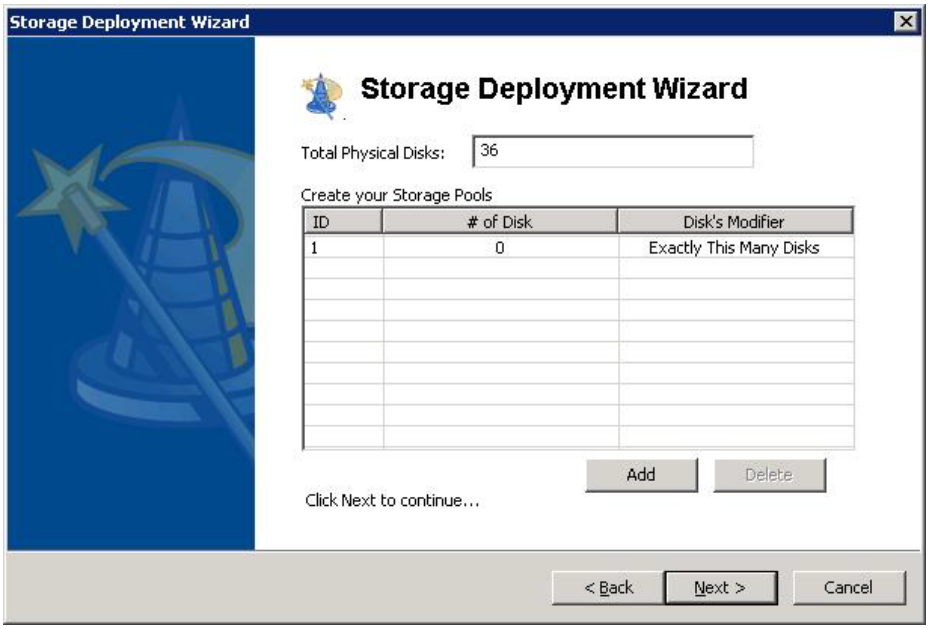

Figure 109 Storage Deployment wizard: create MSA storage pools (custom deployment)

4. On either the Create Your Disk Groups or Create Your Storage Pools wizard window, create one or more disk groups or storage pools as follows:
   a. The Total Physical Disks box specifies the quantity of disks in this subsystem. The total number of disks you allot to your disk groups or storage pools must not exceed this quantity. For example, if this subsystem contains 24 physical disks, you could create three groups/pools, each containing eight disks.
   b. Under # of Disk, enter a quantity of disks allowed in this group or pool.
   c. Under Disk's Modifier, restrict the # Disk entry (see preceding step 4b) by selecting one of the following from the list:
      - **Exactly This Many Disks** specifies that this group/pool must include this number of disks.
      - **At Least This Many Disks** specifies that this group/pool must include a minimum of this number of disks.
      - **At Most This Many Disks** specifies that this group/pool must include a maximum of this number of disks.
      - **The Remaining Disks** specifies that this group/pool must include all of the disks not already included in the preceding disk groups or storage pools on the list, if you are creating multiple disk groups or storage pools. Select this option only for the last disk group or storage pool on the list.
   d. (Optional) To create another disk group or storage pool, click **Add**.
   e. (Optional) To remove a disk group or storage pool, select it, and then click **Delete**.
   f. When you are finished adding, editing, and deleting disk groups or storage pools, click **Next** to continue.

If you are configuring an EVA subsystem, the wizard prompts you to create logical disks for each disk group (Figure 110). If you are configuring an MSA subsystem, the wizard prompts you to create logical disks for each storage pool (Figure 111).

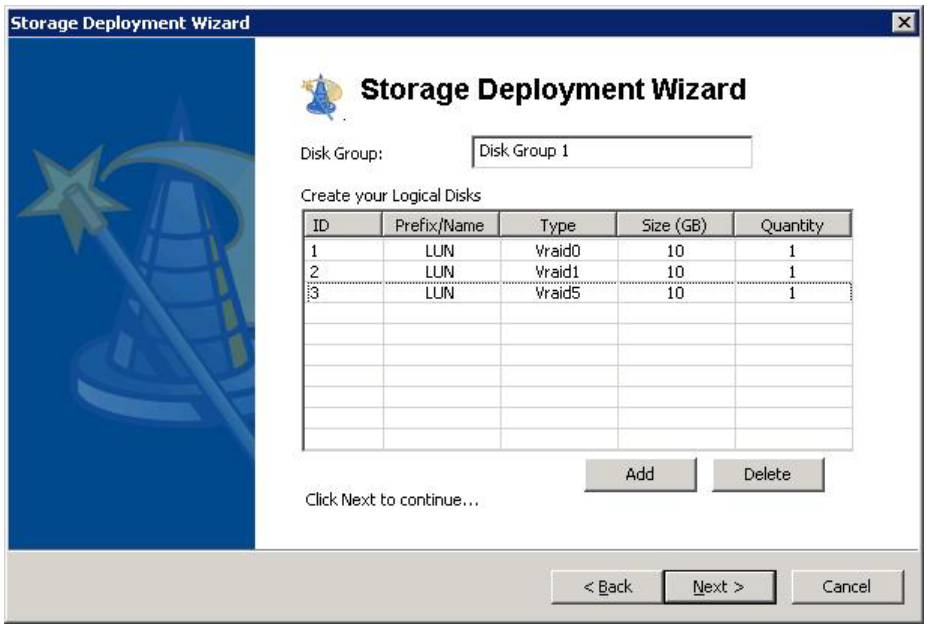

Figure 110 Storage Deployment wizard: create logical disks for EVA (custom deployment)

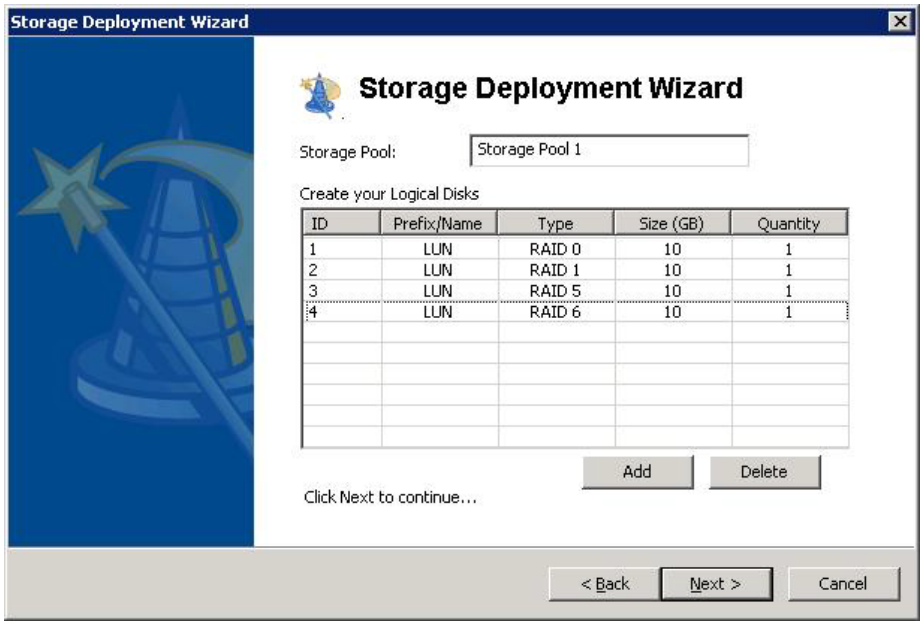

Figure 111 Storage Deployment wizard: create logical disks for MSA (custom deployment)

5. On the Create Your Logical Disks wizard window, create one or more logical disks—for the disk group or storage pool name shown in either the Disk Group or Storage Pool box—as follows:
   a. Under Prefix/Name, enter a logical disk name (up to 32 characters, including alphanumerics, underscores, and hyphens; do not enter spaces or special characters).
   b. Under Type, select a Vraid (for EVA) or RAID (for MSA) type from the list of applicable types for the subsystem. (For an explanation of the Vraid types, see the "Glossary".)

NOTE: On MSA 2000 family subsystems, you can create only one RAID type per storage pool.

   c. Under Size (GB), enter the disk capacity in gigabytes.
   d. Under Quantity, enter the number of LUNs allowed in this disk group or storage pool.

e. (Optional) To create another logical disk, click **Add**.

f. (Optional) To remove a logical disk, select it, and then click **Delete**.

g. When you are finished adding, editing, and deleting logical disks for this disk group or storage pool, click **Next** to continue.

6. If you have multiple disk groups (for EVA storage), the wizard window shown in Figure 110 appears for the next disk group. If you have multiple storage pools (for MSA storage), the wizard window shown in Figure 111 appears for the next storage pool. Complete the wizard window as you did in step 5 for each disk group or storage pool that you created in step 4. Then click **Next** to continue.

   The wizard prompts you to consider if the logical disk creation is set up correctly (Figure 112).

Figure 112 Storage Deployment wizard: continue creating logical disk (custom deployment)

7. To continue, click **Yes**. To redefine the deployment, click **No**.

   Before proceeding with configuring the storage subsystem with the selected option, the wizard displays a summary of the selection and resulting actions (Figure 113).

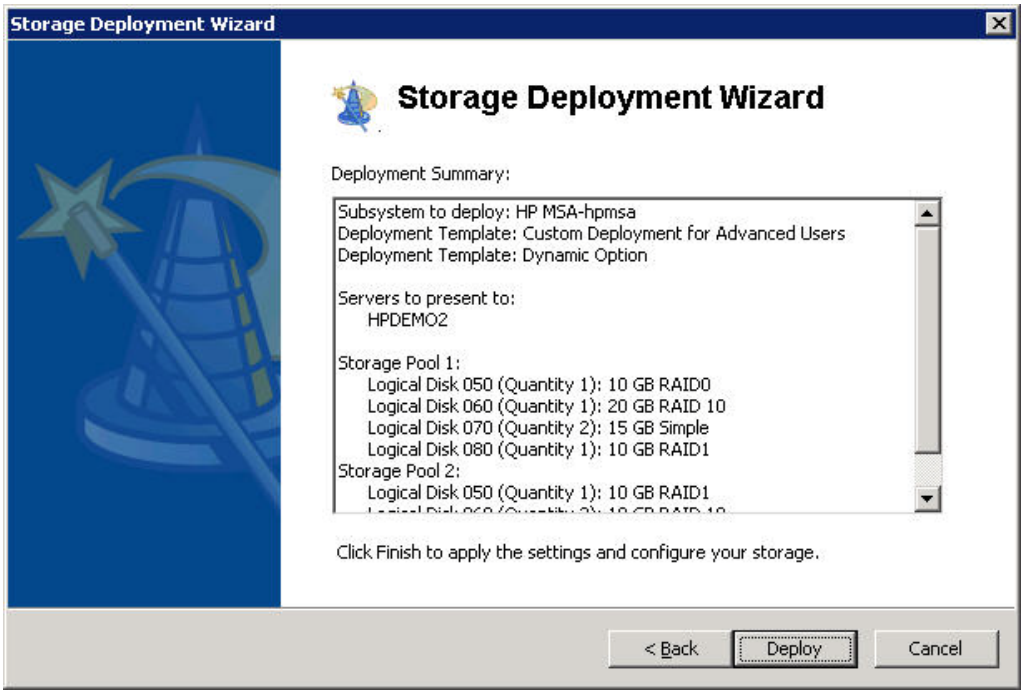

Figure 113 Storage Deployment wizard: summary (custom deployment)

8. Verify the information and then select one of the following options:
   - To confirm and complete the wizard, click **Deploy**.
   - To return to previous wizard windows and review or change your selections, click **Back**.
   - To abandon all selections made using the Storage Deployment wizard, click **Cancel**.

   If you click **Deploy**, using the HP SSSU or the subsystem VDS hardware provider, SAN Connection Manager initializes the subsystem, creates the disk groups or storage pools, creates the LUNs, and presents the LUNs to the servers (hosts) as summarized in Figure 113.

   If the selected subsystem already has logical disks containing data, SAN Connection Manager displays a message warning that the storage subsystem will be uninitialized and all logical disks and their data will be deleted.

9. To acknowledge the warning, uninitialize the storage subsystem, delete all logical disks, and start the Storage Deployment wizard, type **YES,** and then click **OK**. To abandon this deployment, click **Cancel**.

   If the custom configuration deployment completes successfully, the wizard informs you. If the partition is created from the LUNs, it lists the volume name and drive letter assigned for each LUN (Figure 114.)

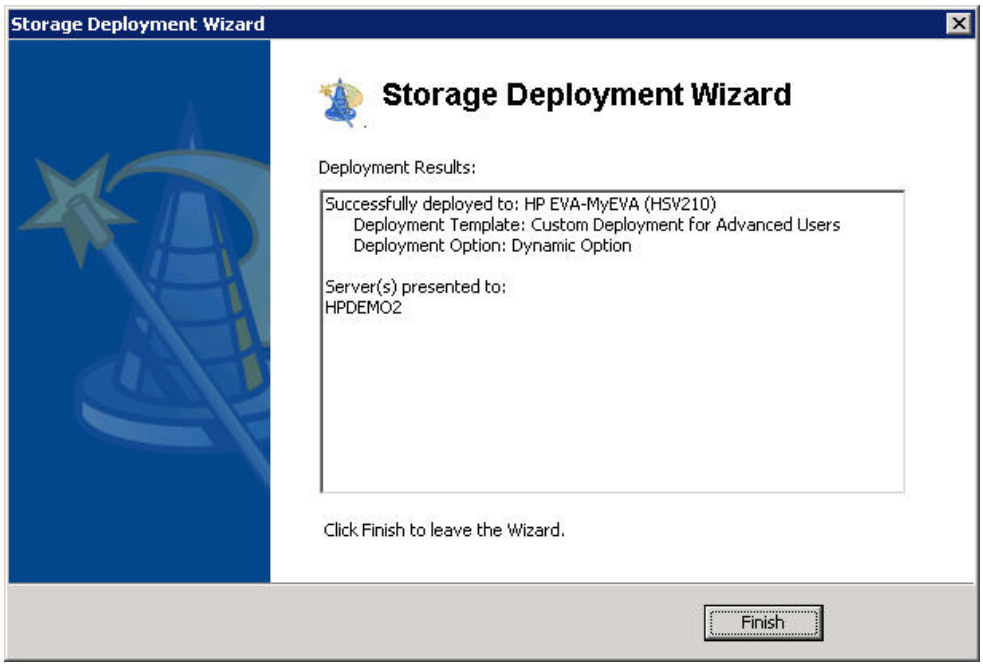

Figure 114 Storage Deployment wizard: deployment results (custom deployment)

11 Support and Other Resources

Prerequisites

Prerequisites for installing and using this product include:

- Knowledge of the Windows operating system
- Knowledge of the hardware and firmware for the following switches:
  - HP 8/20q Fibre Channel Switch
  - HP SN6000 Stackable 8Gb 24-port Single Power Fibre Channel Switch
  - HP SN6000 Stackable 8Gb 24-port Dual Power Fibre Channel Switch
  - HP SN6000 Stackable 8Gb 12-port Single Power FC Switch
  - Knowledge of HP Virtual Connect Enterprise Manager
  - Knowledge of storage subsystems

Document conventions and symbols

Table 7 Document conventions

Convention	Element
Medium blue text: Figure 1	Cross-reference links and email addresses
Medium blue, underlined text (http://www.hp.com)	Website addresses
Bold font	• Keys that are pressed • Text typed into a GUI element, such as into a box • GUI elements that are clicked or selected, such as menu and list items, buttons, and check boxes
Italics font	Text emphasis
`Monospace font`	• File and directory names • System output • Code • Commands, their arguments, and argument values
`Monospace, italic font`	• Code variables • Command-line variables
`Monospace, bold font`	Emphasis of monospace text, including file and directory names, system output, code, and text typed at the command line

⚠ **WARNING!** Indicates that failure to follow directions could result in bodily harm or death.

△ **CAUTION:** Indicates that failure to follow directions could result in damage to equipment or data.

IMPORTANT: Provides clarifying information or specific instructions.

NOTE: Provides additional information.

TIP: Provides helpful hints and shortcuts.

Contacting HP

HP contact information

For HP technical support:

- In the United States, see the Contact HP United States webpage: (http://welcome.hp.com/country/us/en/contact_us.html). To contact HP by phone, call: 1-800-HP-INVENT (1-800-474-6836). This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.
- In other locations, see the Contact HP worldwide (in English) webpage: (http://www.hp.com/country/us/en/wwcontact.html).
- For worldwide technical support information, see the HP support website: http://www.hp.com/support/.

Subscription service

HP recommends that you register your product at the Subscriber's Choice for Business website: http://www.hp.com/go/e-updates. After registering, you will receive an email notification of product enhancements, new driver versions, firmware updates, and other product resources.

Documentation feedback

HP welcomes your feedback.

To make comments and suggestions about product documentation, send a message to storagedocs.feedback@hp.com. Include the document title and manufacturing part number. All submissions become the property of HP.

Related information

Documents

In addition to this guide, see the following documents for this product:

- The *HP 8Gb SAN Connection Kit Quick Start Instructions* provide hardware setup details and software installation steps to help you quickly get started.
- The *HP SAN Connection Manager Help System* provides assistance while using the application. (To access help, press the **F1** key in the application or open the **Help** menu and click **Contents** or **Index**.)
- *HP SAN Connection Manager Release Notes* contains a list of open issues related to this software release.
- *HP 8/20q Fibre Channel Switch Release Notes*
- *HP 8Gb SAN Connection Kit Cabling Guide*
- *HP 8/20q Fibre Channel Switch Installation and Reference Guide*
- *HP SN6000 Fibre Channel Switch Installation and Reference Guide*
- *HP 8/20q Fibre Channel Switch QuickTools Switch Management User Guide*
- *HP SN6000 Fibre Channel Switch QuickTools Switch Management User Guide*
- *HP 8/20q Fibre Channel Switch Command Line Interface Guide*
- *HP SN6000 Fibre Channel Switch Command Line Interface Guide*
- *HP 8/20q Fibre Channel Switch Quick Start Installation Instructions*
- *HP SN6000 Fibre Channel Switch Quick Start Installation Instructions*
- *HP 8/20q and SN6000 Fibre Channel Switch Event Message Reference Guide*
- *HP 8/20q and SN6000 Fibre Channel Switch Simple Network Management Protocol Reference Guide*
- *HP 8/20q and SN6000 Fibre Channel Switch CIM Agent Reference Guide*

- *HP 8/20q and SN6000 Fibre Channel Switch Command Line Interface Quick Reference Guide*
- *HP 8/20q and SN6000 Fibre Channel Switch Rack-Mount Kit Quick Start Installation Instructions*
- *HP 81Q PCI-e Fibre Channel HBA Quick Start Installation Instructions*
- *HP Small Form Factor Pluggable (SFP) Transceiver Installation Instructions*
- *HP SN6000 Fibre Channel Switch XPAK Stacking Cable Quick Start Installation Instructions*
- *HP SN6000 Fibre Channel Switch Power Supply Quick Start Installation Instructions*
- *HP Read Me First*
- *HP Fibre Channel Host Bus Adapters Read Me First*
- *HP End User License Agreement (EULA)*
- *HP Virtual Connect Enterprise Manager User Guide*

For the latest product information, including firmware, documentation, and supported SAN configurations, see one of the following HP web sites: for 8/20q Fibre Channel Switch, http://www.hp.com/go/8Gb-SSC; for SN6000 Fibre Channel Switch, http://www.hp.com/go/SN6000.

Other HP websites

For additional information, see the following HP websites:

- http://www.hp.com
- http://www.hp.com/go/storage
- http://www.docs.hp.com
- http://www.hp.com/go/sandesignguide

Customer self repair

HP products are designed with many Customer Self Repair parts to minimize repair time and allow for greater flexibility in performing defective parts replacement. If during the diagnosis period HP (or HP service providers or service partners) identifies that the repair can be accomplished by the use of a Customer Self Repair part, HP will ship that part directly to you for replacement. There are two categories of Customer Self Repair parts:

- Mandatory—Parts for which Customer Self Repair is mandatory. If you request HP to replace these parts, you will be charged for the travel and labor costs of this service.
- Optional—Parts for which Customer Self Repair is optional. These parts are also designed for customer self repair. If, however, you require that HP replace them for you, there may or may not be additional charges, depending on the type of warranty service designated for your product.

NOTE:

Some HP parts are not designed for Customer Self Repair. In order to satisfy the customer warranty, HP requires that an authorized service provider replace the part. These parts are identified as No in the Illustrated Parts Catalog.

Based on availability and where geography permits, Customer Self Repair parts will be shipped for next business day delivery. Same day or four-hour delivery may be offered at an additional charge where geography permits. If assistance is required, you can call the HP Technical Support Center and a technician will help you over the telephone. HP specifies in the materials shipped with a replacement Customer Self Repair part whether a defective part must be returned to HP. In cases where it is required to return the defective part to HP, you must ship the defective part back to HP within a defined period of time, normally five (5) business days. The defective part must be returned with the associated documentation in the provided shipping material. Failure to return the defective part may result in HP billing you for the replacement. With a Customer Self Repair, HP will pay all shipping and part return costs and determine the courier/carrier to be used.

For more information about the HP Customer Self Repair program, contact your local service provider. For the North American program, visit the HP website (http://www.hp.com/go/selfrepair).

A Troubleshooting

This appendix provides answers regarding the following:

- Dynamic disk support—see page 143.
- Launch-time support—see page 143.
- Linux server on my local SAN is not discovered—see page 144.
- Lost aliases support—see page 144.
- New server support—see page 145.
- OS support—see page 145.
- Refresh Subsystem List support—see page 145.
- SAN Connection Manager does not discover my subsystems—see page 146.
- SAN Connection Manager does not start up—see page 146.
- Storage subsystem fails to create logical disk with maximum size—see page 146.
- `Unknown Server` is shown—see page 147.

Does SAN Connection Manager support dynamic disk functionality?

Symptoms: None.

Solution: None. This version of SAN Connection Manager does not support dynamic disk functionality.

When I launch SAN Connection Manager, it takes a long time to open.

Symptoms: This can be caused by a several factors:

- The subsystem is busy servicing I/O. This only applies on first boot of the server when the operating system is starting up, or when recovering from an error in the caching service.
- The Ethernet network is busier than normal with traffic.
- There are many servers with HP HBAs and agents running. This requires more time for these systems to respond and report to the SAN Connection Manager server discovery.
- There are many subsystems or the subsystems have many logical and physical disks. This requires more time for the subsystems to gather and report the information to SAN Connection Manager.

Solution: Be patient. HP recommends launching SAN Connection Manager during periods of light or no I/O traffic.

Why is the Linux Server on my local SAN not discovered?

Symptoms: A new Linux server has been added to the SAN, and it has the appropriate SAN Connection Manager Agent running, but the Linux server is not being discovered by the Windows 2003 SAN Connection Manager server.

Solution: If the local SAN is not running DNS, there is no Domain Name Server to perform the name server-to-IP resolution for the newly-attached server. You must manually add the Linux Server Name and IP address to the SAN Connection Manager `hosts` file.

NOTE: Most distributions of Linux have the firewall enabled by default. The user must add the portmap and qlremote service TCP/IP ports to allow traffic to pass through.

The file is located at:

```
C:\Windows\system32\drivers\etc\hosts
```

Example of `hosts` file:

```
# Copyright (c) 1993-1999 Microsoft Corp.
#
# This is a sample HOSTS file used by Microsoft TCP/IP for Windows.
#
# This file contains the mappings of IP addresses to host names.
# Each entry should be kept on an individual line. The IP address
# should be placed in the first column followed by the
# corresponding host name. The IP address and the host name should
# be separated by at least one space.
#
# Additionally, comments (such as these) may be inserted on
# individual lines or following the machine name denoted by a '#'
# symbol.
#
# For example:
#
#      102.54.94.97      rhino.acme.com      # source server
#       38.25.63.10      x.acme.com          # x client host

127.0.0.1       localhost
10.1.6.65       apsun01
10.3.8.5        DL145-1
10.3.8.127      DL380G3-2
10.3.8.107      DL320-1
10.3.8.109      ml370-1
```

How do I prevent losing aliases when updating SAN Connection Manager to a new version?

Symptoms: I updated SAN Connection Manager to a newer version and when I re-launched the program, all of my aliases were lost. How do I save them before updating to a newer version?

Solution: Before removing, reinstalling, or updating the SAN Connection Manager application, preserve your aliases by saving the file `HP_SSCM.ALI`. This file is located in the same directory as the SAN Connection Manager executable. After the new version has been installed, copy the file back to the directory where the new executable is installed.

This also applies when you install and launch SAN Connection Manager on a new server and want to preserve the aliases created when running SAN Connection Manager on an older server.

I brought a new server online and connected it to both the SAN and LAN, but SAN Connection Manager does not see it. Why not?

Symptoms: If SAN Connection Manager has already been launched prior to a new server being turned on and connected to the LAN and SAN, SAN Connection Manager does not automatically see this server.

Solution: Possible solutions include:

- Click **Refresh the Server List** (see "Refreshing the server list," page 103).
- Re-launch the application for the new server to appear. (This also applies to a server taken offline.)
- Ensure that QLRemote is running:
  - In Windows: From Administrative Tools, Services, check to make sure the service named "QLManagementAgentJava" is started and running. Or, in Task Manager, check for `QLremote.exe`.
  - In Linux: Enter `/etc/init.d/qlremote status`. The system should show QLRemote as running.

Is all of the functionality provided in SAN Connection Manager supported on all the OSs on which the application runs?

Symptoms: Some SAN Connection Manager options are only supported on specific operating systems.

Solution: The following options are supported on the various OSs.

- Linux host with QLRemote:
  - Discover the host and its HBAs
  - Assign LUN to the host and its HBAs
  - Update HBA BIOS
- Windows host with SAN Connection Manager/QLRemote:
  - Discover the host and its HBAs
  - Assign LUN to the host and its HBAs
  - Update HBA BIOS and drivers

I tried to perform a Refresh Subsystem List and the application seems to have stopped.

Symptoms: When you click **Refresh the Storage Subsystem List** (see "Refreshing the storage subsystem list," page 125), the system experiences an FC disruption to the storage subsystem. This may result in SAN Connection Manager being in a "hung" state and not able to recover. If the FC connection is re-established, the application should be able to communicate with the storage subsystem again. However, some hardware providers may not be able to recover, causing the application to exit and no longer able to discover the subsystem.

Solution: To resolve this issue, make sure that the FC connection is back to normal, and then try to restart the Virtual Disk Services service through either Computer Management's Service (`services.msc` command) or Command Line.

When I open SAN Connection Manager, why doesn't it discover my subsystems?

Symptoms: This can be caused by several factors:

- Another application is running on the same or different system and connects to the subsystem. Some storage subsystems only allow a single application to connect and perform management functions on them.
- The subsystems do not have an FC link to the SAN Connection Manager system. SAN Connection Manager requires a direct FC link to discover and manage the subsystem.
- The subsystem's hardware provider has not been installed or registered on the SAN Connection Manager system.

Solution: Ensure that your subsystems have a direct FC link and that the subsystem's hardware is registered on SAN Connection Manager.

Why doesn't SAN Connection Manager start up?

Symptoms: When I try to start SAN Connection Manager, it does not open and I get an error message. This happens when multiple copies of SAN Connection Manager are trying to be used within the SAN at the same time. On launching SAN Connection Manager, a message box saying:

```
The application cannot run. No storage subsystem was
detected.
```

Solution: Close all instances of SAN Connection Manager running on other machines connected to the SAN, and then re-launch SAN Connection Manager.

Why does the storage subsystem fail to create logical disk with maximum size?

Symptoms: When creating a logical disk with the maximum size allowed, some storage subsystems fail the request with one of the following error messages:

```
Not enough space for the new logical disk.
Cannot complete the logical disk creation request.
```

This could be because the subsystems do not have enough space for the new logical disk's size. The subsystems might need space for the new logical disk overhead or space is not available because of bad sectors on the drives.

Solution: When this problem occurs, reduce the logical disk size and re-initiate the logical disk creation request.

In the Logical Disk Server Presentation dialog box, it shows "Unknown Server." What does this mean?

Symptoms: An Unknown Server may appear if:

- The logical disk in the storage subsystem is assigned to an HBA, but the application cannot discover that HBA in any of the servers.
- The server is offline.
- The HBA is from a vendor other than HP.
- You made specific changes to an HBA (for example, changing the type).

In the Logical Disk Server Presentation dialog box, you may then be unable to deny access to that HBA or server (that is, you cannot remove it from the "allowed" list). This behavior occurs because the removed HBA remains saved by the array. To permanently remove this type of HBA, you must use an array utility:

- For EVA storage, use EVA Command View.
- For MSA storage, use ACU.

To access the array utility, view either the Physical Connection map or LUN assignment map, right-click a storage subsystem icon, and on the shortcut menu, click **Launch Subsystem Management Application**.

Solution: Ensure that the server is online and that the HBA is from HP and not from another vendor. To permanently remove the HBA, use an array utility as described in the previous paragraph.

During a server, switch, or storage refresh, I receive an error message similar to the following: The shared memory for [HOST, SWITCH, or VDS] objects is full. Please consult the user's guide to increase the size of the shared memory and reboot the system for the changes to take effect.

Symptoms: When you have a very large SAN, the object database allocated in memory is not large enough to support the contents of the entire database. A user usually receives this message when adding a new device to an already massive SAN or by having an extremely large number of LUNs.

Solution: For the message that states HOST objects are full, open the following file using a text editor on your management station only:

```
C:\Program Files\QLogic
Corporation\RemotePartition\host_config.xml
```

For the message that states SWITCH objects are full, open the following file using a text editor on your management station only:

```
C:\Program Files\QLogic
Corporation\RemotePartition\switch_config.xml
```

For the message that states STORAGE or VDS objects are full, open the following file using a text editor on your management station only:

```
C:\Program Files\QLogic
Corporation\RemotePartition\vds_config.xml
```

Search for the XML node called memory (in bold), which looks like the following:

```
<config>
   <general>
      <interval>3600000</interval>
      <memory>16777216</memory>
      <discovery>1</discovery>
   </general>
</config>
```

This value represents the memory size to be used for the database. Replace the value with a larger numeric value than what is currently set. HP recommends that you find the current value in the list below and then use the next largest value as your new value. The following values are recommended:

- 16777216
- 33554432
- 67108864
- 134217728

Using the XML above as an example, the next largest value would be 33554432 and the new contents of the file would look like the following:

```
<config>
   <general>
      <interval>3600000</interval>
      <memory>33554432</memory>
      <discovery>1</discovery>
   </general>
</config>
```

Save the changes to the XML file and then reboot the management station. SCM will now start normally with a larger database size in memory.

Glossary

ACU Array Configuration Utility

adapter See HBA (host bus adapter).

AH Authentication Header

controller A hardware device that facilitates communication between a host and one or more LUNs organized as an array.

device A target, typically a disk drive. Hardware such as a disk drive, tape drive, printer, or keyboard that is installed in or connected to a system. In FC, a target device.

DHCP Dynamic Host Configuration Protocol for IPv4. DHCP allows computers to get configuration information about the network from the network. Addresses are "leased" from servers to clients for a period of time.

DHCPv6 Dynamic Host Configuration Protocol for IPv6. Although IPv6's stateless address autoconfiguration removes the primary motivation for DHCP in IPv4, DHCPv6 can still be used to statefully assign addresses if the network administrator requires more control over addressing.

DNS Domain Name Server or Domain Name System. A computer program running on a Web server, translating domain names into IP addresses.

domain ID A number that uniquely identifies a switch in a fabric; the highest or most significant hierarchical level in the three-level address hierarchy. Generally, each switch is a single domain. The domain ID is an 8-bit identifier with a range of 0–255. Typically, zero (0) is reserved and one (1) is the default setting for new switches.

driver The software that interfaces between the file system and a physical data storage device or network media.

The level structure for Windows XP Professional/2000/Windows Server 2003 drivers is as follows:

- *Class Driver.* The highest driver level. There is a separate class for disk, Ethernet, and so forth. This level handles all generic aspects of operations for that class.
- *Port Driver.* The middle driver level, which handles aspects of the operation specific to the port type; for example, there is a port driver for SCSI.

ESP Encapsulating Security Payload

EVA HP Enterprise Virtual Array. A high-performance, high-capacity, and high-availability storage solution. Each EVA storage system includes a pair of HSV virtualizing storage controllers and the disk drives they manage.

FC Fibre Channel

FDMI Fabric device management interface is a standard enabling the management of devices such as HBAs through the fabric.

Fibre Channel (FC) A high-speed serial interface technology that supports other higher layer protocols like SCSI and IP. Standardized under ANSI in 1994.

HBA (host bus adapter) The board that interfaces between the host system and the target devices. HBA is synonymous with adapter, host adapter, and adapter board.

HBA alias	A user-defined name for an HBA.
HBA port	A port on the HBA board.
HBA port alias	A user-defined name for an HBA port.
host	The computer system on which the SAN Connection Manager software is running.
IE	Internet Explorer
IP security	IPsec (IP security) is a suite of protocols for securing Internet Protocol (IP) communications by authenticating and encrypting each IP packet in a data stream. IPsec also includes protocols for cryptographic key establishment.
IPv4	Internet Protocol version 4 is the fourth iteration of the Internet protocol and the first version of the protocol to be widely deployed. IPv4 is the dominant network layer protocol on the Internet and, other than IPv6, it is the only standard internetwork-layer protocol used on the Internet.
IPv6	Internet Protocol version 6 is a network layer for packet-switched internetworks. IPv6 is designated as the successor of IPv4, the current version of the Internet protocol, for general use on the Internet. IPv6 provides a much larger address space that allows greater flexibility in assigning addresses.
ISL	Inter-switch link (ISL) is a connection between a port on one switch and a port on another switch.
IFZ	Inter-Fabric Zone
JRE	Java Runtime Environment
LUN	Logical unit number, a subdivision of a SCSI target. A LUN is the small integer handle that differentiates an individual disk drive or partition (volume) within a common SCSI target device such as a disk array. Technically, a LUN can be a single physical disk drive, multiple physical disk drives, or a portion (volume) of a single physical disk drive. However, LUNs are typically not entire disk drives but rather virtual partitions (volumes) of a RAID set. Using LUNs, the FC host can address multiple peripheral devices that may share a common controller.
LUN masking	A software feature that assigns LUNs to specific servers or hides LUNs from specific servers for maximum access and availability control.
MSA	HP Modular Smart Array. MSA allows you to “hot add” drives, servers, and disk enclosures—which delivers significant operational savings over traditional Direct Attach Storage (DAS)—while maintaining the affordability and efficiency of Smart Array.
NDP	Neighbor Discovery Protocol for IPv6 is part of the Stateless Address Autoconfiguration protocol. It replaces the Address Resolution Protocol used with IPv4.
network adapter	A chip that provides network capabilities. A computer may include a network adapter on its system board, or on an adapter card. Also a NIC (network interface card or controller).
NIC	Network interface card or controller
NTFS	NT File System, the file system for the Windows NT/2000/XP operating system. NTFS provides increase reliability and security in comparison to other methods of organizing and accessing files.
partition	A portion of a physical disk that functions as if it were a physically separate unit and is dedicated to a particular operating system or application and accessed as a single unit.

path

A path to a device is a combination of a HBA port instance and a target port as distinct from internal paths in the fabric network. A fabric network appears to the operating system as an opaque network between the HBA (initiator) and the target.

Since a path is a combination of an HBA and a target port, it is distinct from another path if it is accessed through a different HBA and/or it is accessing a different target port. Consequently, when switching from one path to another, the driver might be selecting a different HBA (initiator), a different target port, or both.

This is important to the driver when selecting the proper method of failover notification. It can make a difference to the target device, which might have to take different actions when receiving retries of the request from another initiator or on a different port.

PCI Express (PCIe)

A third-generation input/output (I/O) standard that allows enhanced Ethernet network performance beyond that of the older Peripheral Component Interconnect (PCI) and PCI Extended (PCI-X) desktop and server slots. The higher performance of PCI Express derives from its faster, serial-bus architecture, which provides a dedicated, bi-directional I/O with 2.5-GHz clocking, beneficial to Ethernet network connectivity for desktops, workstations, and servers.

port

Access points in a device where a link attaches. The four types of ports include the following:

- N_Port (Node Port)—an FC port that supports point-to-point topology.
- NL_Port (Node Loop Port)—an FC port that supports loop topology.
- F_Port (Fabric Port)—a port in a fabric where an N_Port can attach.
- FL_Port (Fabric Loop Port)—a port in a fabric where an NL_Port can attach.

port instance

The number of a port in the system. Each HBA may have one or multiple ports, identified with regard to the HBA as port 0, port 1 and so forth. to avoid confusion when dealing with a system containing numerous ports, each port is assigned a port instance number when the system boots up. So Port 0 on an HBA might have a port instance number of, for example, 8 if it is the eighth port discovered by the system.

RHEL

Red Hat Enterprise Linux

SAD

Security association database

SAN

Storage area network, multiple storage units (disk drives) and servers connected by networking topology.

SAS

Serial attached SCSI; a data transfer technology designed to move data to and from computer storage devices such as hard drives and tape drives.

SATA

Serial advanced technology attachment; the new standard for connecting hard drives with serial signaling technology.

SLES

SUSE Linux Enterprise Server

SCM

SAN Connection Manager

SMU

Storage Management Utility

SNMP

Simple Network Management Protocol

SPD

Security policy database

SPI

Security parameter index, an identification tag added to the header while using IPsec for tunneling IP traffic. This tag helps the kernel discern between two traffic streams where different encryption rules and algorithms may be in use.

SSSU

HP Storage System Scripting Utility software (SSSU), a powerful scripting utility. The SSSU provides a host to array communications bridge for documenting and automating EVA local and remote configuration tasks.

stack	A set of up to six switches interconnected through one or more of the four XPAK 10Gb ports. The stack can be managed as though it were a single switch.
target	The storage-device endpoint of a SCSI session. Initiators request data from targets. Targets are typically disk-drives, tape-drives, or other media devices. Typically a SCSI peripheral device is the target, but a host bus adapter may, in some cases, be a target. A target can contain many LUNs. A target is a device that responds to a requested by an initiator (the host system). Peripherals are targets, but for some commands (for example, a SCSI COPY command), the peripheral may act as an initiator.
target binding	The process in which the HBA driver binds a target ID using a target's world wide port name (WWPN) or port ID. This enables the target ID to always connect to the WWPN or port ID across reboots regardless of SAN reconfigurations.
topology	The collection of components that connect ports. Topologies are also shorthand descriptions of the physical layouts, or shapes, of networks. A topology defines different aspects of device connection or configuration—including the kinds of devices that can be configured, the number of devices, and the way they can be configured. SAN Connection Manager enables you to save and compare topologies.
Transparent Router (TR)	Transparent Router provides inter-fabric routing to allow controlled and limited access between devices on a switch (local) fabric and devices on a remote fabric of other vendor switches.
VC	Virtual Connect
VC-FC	Virtual Connect-Fibre Channel
Virtual Connect Enterprise Manager (VCEM)	VCEM centralizes connection management and workload mobility for HP BladeSystem servers that use Virtual Connect to access LANs, SANs, and converged network infrastructures.
VDS	Virtual Disk Service (VDS) is a set of application programming interfaces (APIs) that provides a single interface for managing disks. VDS provides an end-to-end solution for managing storage hardware and disks, and for creating volumes on those disks.
Vraid0	A virtualization technique for EVA storage that provides no data protection. Data host is broken down into chunks and distributed on the disks comprising the disk group from which the virtual disk was created. Reading and writing to a Vraid0 virtual disk is very fast and makes the fullest use of the available storage, but there is no data protection (redundancy) unless there is parity.
Vraid1	A virtualization technique for EVA storage that provides the highest level of data protection. All data blocks are mirrored or written twice on separate physical disks. For read requests, the block can be read from either disk, which can increase performance. Mirroring takes the most storage space because twice the storage capacity must be allocated for a given amount of data.
Vraid5	A virtualization technique for EVA storage that uses parity striping to provide moderate data protection. Parity is a data protection mechanism for a striped virtual disk. A striped virtual disk is one where the data to and from the host is broken down into chunks and distributed on the physical disks comprising the disk group in which the virtual disk was created. If the striped virtual disk has parity, another chunk (a parity chunk) is calculated from the set of data chunks and written to the physical disks. If one of the data chunks becomes corrupted, the data can be reconstructed from the parity chunk and the remaining data chunks.

Vraid6 Vraid6 has the highest availability of any Vraid type. It uses dual parity to provide protection from simultaneous failure of two disk drives within a parity stripe. Vraid6 stripes have four data blocks and two parity blocks. A new disk group type has been added to facilitate Vraid6 support. The enhanced disk group can simultaneously contain virtual disks of all supported Vraid types. The legacy disk group type supports all Vraid types except for Vraid6. The disk group type is set at the time of creation and cannot be changed after that time.

Note: SAN Connection Manager supports Vraid6 only for the EVA4400/6400/8400 running firmware version 9500000 or later.

WWPN World Wide Port Name

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